

**Title:** Russian-English Glossary *Compiled from*

**Source:** Compiled from "Manual for Polar Workers", by S. D. LAPPO,  
published by GUSMP, 1946

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Chapter I. Vodnyye Prostranstva (Water Areas).

MIROVOY OKEAN - World ocean

OKEAN - Ocean

OKEANICHESKIYE BASSEINY - (Ocean basins) - part of oceans which are dotted with islands and submarine mountains.

MORE - (Sea) - part of an ocean, more or less deep, extending into the land or bounded by islands and different from the remaining part of the basin in composition, movement and origin of the water.

OKEANICHESKIYE (INGRESSIVNYE) MORYA - [Oceanic (Ingressive) Seas] - formed as a result of breaks in the earth's crust and its sudden sinking. Their depth usually exceeds 2000 meters, however those which are less than 3800 meters deep are known as MELKOVODNYE OKEANICHESKIYE MORYA (shallow oceanic seas), and those whose depth exceeds 3800 meters are known as GLUBOKOVODNYE OKEANICHESKIYE MORYA (Deep water oceanic seas).

MATERIKOVYYE (TRANSGRESSIVNYE) MORYA - [Continental (Transgressive) Seas] - formed as the result of the sinking of coastal parts of a continent or by erosion of the coast line. Their depth averages less than 1000 meters. Those which are more than 200 meters deep are known as GLUBOKOVODNYE MATERIKOVYYE MORYA (Deep water continental seas), while those whose average depth is 50 meters are known as MELKOVODNYE MATERIKOVYYE MORYA (Shallow water continental seas).

MORYA SMESHANNOGO TIPA - (Mixed type seas) - usually located on a continental shelf, and include parts which have oceanic depths.

OKRAINYYE MORYA - (Bordering Seas) - can be classed as transgressive seas, which border on the main land and are separated from the ocean by islands or peninsulas.

KRAYEVYYE MORYA - (Marginal Seas) - see OKRAINYYE MORYA.

SREDIZHENYYE MORYA - (Island Seas) - situated inside or between continents, extend deeply into the land and are joined to the ocean by straits. (IN:

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This, in the singular, is the Russian name for the Mediterranean).

VNUTRENNIYE MORYA - (Internal Seas) - see SREDIZEMNYE MORYA.

MEZHDMATERIKOVYYE MORYA - (Inter-continental seas) - lie between continents.

VNUTRIMATERIKOVYYE MORYA - (Intra-continental seas) - are surrounded by the shores of one continent only.

MEZHOSTROVNIYE MORYA - (Inter-island seas) - are located between islands.

OSTROVNIYE MORYA - (Island seas) - see MEZHOSTROVNIYE MORYA.

BASSEYNIYE MORYA - (Basin seas) - consist of one or several basins, separated from one another by submarine mountain ranges.

PROLIVNIYE MORYA - (Strait seas) - include such a large quantity of islands and narrow gulfs that the total land surface within the limits of the sea constitutes a substantial part of the whole surface of the sea.

ZALIV - Gulf.

ZAVOD' - (Backwater) - has two meanings: 1 - a small open inlet, and 2 - a turn in the shore line where the current (river or sea), on striking a projecting part, has taken a reverse direction along the shore.

LAGUNA - a small shallow water sea gulf. Term used only in the White Sea.

ZATIAG - a gulf cutting deep into the land. Term used only in the White Sea.

GUBA - (Narrow gulf) - narrow gulfs (fjords) characteristic of the Arctic.

A "Guba" is divided into the following parts:

VERSHINA - the top (head).

UST'YE - the mouth.

SHIRINA - width at its greatest shore to shore breadth.

DLINA - length from the VERSHINA to the UST'YE.

PLECHI - shoulders, formed by the sea coast adjoining the UST'YE.

KUT - another term for the VERSHINA (head) of a gulf or guba. Used in several Arctic Seas besides the White Sea.

BUKHTA - Bay

VNUTRENNYAYA BUKHTA - (Inner Bay) - found inside another bay.

VNUTRENNYI ZALIV - (Inner gulf) - found inside another gulf.

KOVSH - (harbor) - is an inner bay (bukhta) formed by low lying sand bars, which are visible only during low tide. Typical "kovshi" are SEVERNAYA BUKHTA and YUZHNAJA BUKHTA in CHESKAYA GUBA.

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FIORD - Fjord.

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RIAS - (Ria) - deep gulfs with winding shore contours, formed by the sea's flooding the lower reaches of valleys. Are found on NOVAYA ZEMLYA.

RODNIY - wide, unevenly branched gulfs cutting deeply into the land and separated from the sea by islands or peninsulas.

SHERNY - short, straight sided, blunt bays separated from one another by projections of various sizes.

LAGUNA - (Lagoon) - shoaly gulf stretching along the shore. A lagoon or GAFA is formed by sand bars.

ZAPOROZH'YE - deep water beyond reefs which is visible during low tide. Term used in the White Sea.

ZALUD'YE - part of the water just off the shore, separated from the sea by LUZKY (small bare islets).

ZAKOSHECH'YE - a deep place beyond sand banks which is visible during low tides. Term used in the White Sea.

PROLIV - (Strait) - which is divided into:

GLUBOKOVODNYY PROLIV - (Deep water strait) - with depths more than 1000 meters, and

MELKOVODNYY PROLIV - (Shallow water strait) - with depths less than 50 meters.

FIORDOVYYE PROLIVE - (Fjord strait) - deep indentations with steep banks. Glacial origin.

VOROTA - (Gates) - nautical term for a short, sea strait.

GORLO - (Throat) - term applied to a strait which joins lagoons, or any type of basin to the sea.

SALMA - term for a strait in the White Sea.

SHAR - native term for a strait.

SURETOX - nautical term for a narrow strait or canal.

MORSKIYE REKI - (Sea rivers) - are rivers which flow into the sea.

KONTINENTAL'NIYE REKI - (Continental rivers) - are rivers which do not empty into the sea.

TUNDROVYYE REKI - (Tundra rivers) - originate in the tundra and are fed by melting snows and thawing of permafrost soils.

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PIES(O) - (Reach) - is the term applied to that part of a river which runs between sand banks, and has a steady flow. Usually possesses deep even bottom.

KUR'YA - term applied to a gulf formed in a river, usually during spring floods. Also applied to estuary gulfs.

PROTOKA - branch of a river formed by islands; usually narrower and with less water than the main channel (ruslo).

GLAVNAYA PROTOKA - the largest branch in a series of branches formed by islands in a river.

RUKAV - (Sleeve or Branch) - branch of a river at its mouth, due to islands, having an independent outlet to the sea. Sometimes also called "Protoka".

DEL'TA REKI - (Delta of a river) - these are divided into:

PODVODNIYE - (Submerged) or OTRITSATEL'NIYE - (Negative) - when river deposits form deltas which remain under water.

NADVODNIYE - (Above water) or POLOZHITEL'NIYE - (Positive) - are formed when the material deposited by the river rises above the surface of the water.

DEL'TA VYPOLNENIYA or VNUTRENNYAYA - (Filled up, or internal delta) - formed when a river has to cut through a ridge at its outlet to the sea, or when it flows into a bay extending deep into the land, where it first fills up the bay before beginning to move into the open sea.

LAGUNNAYA DEL'TA - (Lagoon delta) - formed when a river flows into a lagoon.

VYDVINUTIYE DEL'TY - (Extended deltas) - above water deltas which extend out to sea beyond the shore line.

BERGOVIYE DEL'TY - (Shore deltas) - above water deltas which do not extend beyond the shore line.

ESTUARIJ - Estuaries.

LIMANY - types of estuaries which are submerged by sea water, but separated from the sea by sand banks. Narrow channels between the sand banks give river water access to the open sea.

OZERO - (Lake) - which can be divided into:

SOLENOYE OZERO - (Salt lake).

FRESHNOYE OZERO - (Fresh water lake).

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STOCHNOYE OZERO - (Drainage lake) - which has an outlet in a river.

BESSTOCHNOYE or KONECHNOYE OZERO - (Non-draining or terminal lake) - which has no outlet.

PROSTOCHNOYE OZERO - (Through drainage lake) - which has a river flowing into it and a river flowing out of it.

MATERIKOVOYE (VNUTRENNIYE) OZERO - (Continental [internal] lake) - formed in continents and off-shore islands by submersion of the land and fed by runoff of continental waters.

RELIKTOVOYE (OSTATOCHNOYE) OZERO - ("Relic" [residual] lake) - formed in continents, but were originated by sea water.

BEREGOVOYE OZERO - (Shore lake) - formed in the shore belt as a result of sand bars lying across the route of a water current.

DEL'TOVOYE OZERO - (Delta lake) - formed by river deposit bars in river deltas.

DYUNNOYE OZERO - (Dune lake) - formed in the basins between dunes.

OZERO OBRAZOVANNOYE ZAPRUDOY BEREGOVOGO VALA - lakes formed by the piling up of a bank along the shore - of sand, gravel, shells, etc.

FIORDOVOYE OZERO - (Fjord lake) - continuations of fjords and are similar to fjords in character, nature, and form.

LAYDA - a local Yakut term which is applied to a lake, or more often a tundra marsh, with or without access to a sea or river. Also used to signify "shallows".

VYBUN - term for a deep marsh in a tundra.

ZALESHCHINA or LESECHAD' - pools which remain on a drying sea shore.

GAVAN' - (Harbour).

YAKORNAYA STOYANKA - anchorage.

STANOVISHCHE or STANOV'YE - natural harbor. STANOVISHCHE also is a term applied to a small settlement.

REYD - Roadstead.

PORT - Port.

FARVATER - Fairway.

KANAL - Canal.

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Chapter II. Formy Sush'i i Beragovoy Polosy.(Forms of the Land and the Coastal Strip)

MATERIK - Continent.

KONTINENT - Continent.

MALYY KONTINENT - (Small continent) - term sometimes applied to very large islands.

OSTROV - Island.

KONTINENTAL'NIYE OSTROVA - (Continental islands) - island belonging to the KONTINENTAL'NY MASSIV (continental mass) and composed of the same rock (poroda) as the continent.

PRIERAZHNIYE OSTROVA - (Coastal islands) - are found close in to the coast and usually follow the coast line. These can be divided into: FIORDOVYYE OSTROVA (Fjord type islands), LIMANNIYE OSTROVA (Estuary islands), SHYBERNYYE OSTROVA (Sherries) or RIASOVYYE OSTROVA (Ria islands). Examples of PRIERAZHNIYE OSTROVA are the various islands of the Novaya Zemly's group or Vaigach and Kil'din Islands.

SAMOSTOYATEL'NIYE OSTROVA - (Independent islands) - which are farther separated from the continental coast. Examples are the northern and southern island of Novaya Zemly's, and Vize and Shmidt Islands.

OSTROVA ARTICHESKOY STUPENI - (Islands of the Arctic Shelf) - are those islands which are located on the continental slope. They are greatly separated from the continent but have structural similarities with the continent. De-Long Island is an example.

OKEANICHESKIYE OSTROVA - (Oceanic islands) - have never been close to any continent.

VULKANICHESKIYE OSTROVA - Volcanic islands.

KORALLOVYYE OSTROVA - Coral islands.

PARAZITNIYE OSTROVA - (Parasitic islands) - a term sometimes applied to Volcanic or Coral Islands.

NAVOSNIYE OSTROVA - (Alluvial islands) - are formed as a result of the accumulation of sedimentary deposits. These are sometimes known as OSTROVA DEL'T (Delta islands).

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- MORENNIYE OSTROVA - (Moraine islands) - are also classed as Sedimentary islands.
- PHYTOGENNIYE OSTROVA - (Phytogenous islands) - are those which have been formed by growing matter.
- GRUPPA OSTROVA - Island group.
- ARKHIPELAG - Archipelago.
- SHKHERY - (Skerries) - numerous granite rocks close in to the sea coast.
- OSTROVKI - KAMNI - (Rock islands) - small islands in the form of rocks projecting above the surface of the sea.
- OTPRYADYSH - a rock projecting from the water near the shore.
- BAKLANETS - large rock protrudence or a small island with steep sides.
- BAKLYSH - nautical term used in the White Sea for a BAKLANETS.
- KUVSHIN - nautical term applied to a small island with a steep shore line.
- KORGA - (Rock reef) - small rocky island, standing close in to shore and formed as a result of the disintegration of the shore.
- LUDA - term used in the White Sea for a small rocky island which has no vegetation.
- POLUOSTROV - (Peninsula).
- POLUOSTROV OTCHLENIENIYA - are peninsulas which are continuations of the continent and have relief similar to the adjoining part of the continent.
- POLUOSTROV PRICHELENIYA - are remains of unattached land, which in one way or another became attached to the continent.
- PERESHEYEK - Isthmus.
- PEREYMA - nautical term used in the White Sea to denote an isthmus which was formed by building up of deposits and sediment.
- VOLOK - low stretch of ground lying between two rivers. For example the woody VOLOK on the Yamal Peninsula between the upper reaches of the Mutnaya and Zel'naya Rivers.
- MYS - Cape
- KRYLATYY MYS - (Winged cape) - term applied to a cape which has projections in both directions at its end.
- BYSTURY - (Prominence) - low lying prominence with evenly sloping shores.

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- TOLBEI - Kara Sea terminology for a low lying, steep cape.
- VZGLAVIYE - nautical term for the tip of an island or sea shore; a cape.
- NAVOLOK - White Sea and Murmansk coast term for a blunt cape.
- KHOBOTILO - nautical term for a crooked cape.
- KURAK - nautical term for a flat and craggy prominence on a rocky shore.
- ZAGIBEN' - nautical term for the bend in a river or a cape.
- KOSA - (spit) - Spits can be either: PRYAMOLINEYNYE (straight edged), KRUGLOVIDNYE (round), ZAGNUTIYE (bent), and SLOZHNIYE (complex).
- PERESYP' - (over flow) - sedimentary spit, partly or completely separating a bay from the sea, thus forming a lagoon or lake.
- TOMBOLO' - A PERESYP' which joins an island to a continent, or one island to another.
- STRELKA - (Point) - a spit (KOSA) terminating in a sharp point.
- UREZ VODY - (water's edge) - line of the level of the sea on the shore.
- BEREGOVAYA LINIYA - (Shore line) - the boundary between the land and surface of a lake or the sea. In the case of seas it is determined by the water's edge at the low ebb syzygy.
- KONTUR BEREGA - (Shore contour) - the line determined by the high tide mark.
- BEREGOVYE DUGI - Shore arc.
- BEREGOVYE IZLUCHINY - Shore bend.
- PRILUK - edge of a shore bend.
- POBEREZH'YE - Littoral.
- BEREGOVYE TERRASY - (Shore terrace) - horizontal areas on the land slope, bordering the sea.
- BEREG - (Shore).
- PRILIVO - OTLIVNAYA POLOSA - (Foreshore) - belt of shore between the low tide mark and the high tide mark.
- SGONNO - NAGONNAYA POLOSA - (Wind-tidal strip) - on seas which are not affected by tides, the belt of shore between the high and low water marks as the water level fluctuates due to action of the wind.
- VOLNOPRIBOYNAYA POLOSA - (Surf strip) - strip of shore between the high point to which the surf reaches and the line where the sea bottom is bared as the water flows back to the foot of the next incoming breaker.

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ZONA ZAPLESKOV - that part of the shore which is not flooded and which lies between highest point attained by the surf and the point of highest high tide.

ZONA BURUNOV - Swash zone.

PLYASH - Beach.

BEREGOVOY VAL - Shore bank.

PLAVNIK - Drift wood.

NAMOINA - nautical term applied to small pebbles, twigs and marine plants, carried on shore by breakers.

PODVODNIY BEREGOVOY BAR - Submarine shore bar.

ZABURUN'YE - another term for submarine shore bar.

BEREGOVOY BAR - Shore bar.

BEREGOVOY OBRIV - Shore steep.

KLIFF - Cliff.

VOLNOPRIBOYNAYA NISHA - (Wave cut niche) - the hollow formed by swells at the foot of a cliff.

PODVODNIY BEREGOVOY SKLON - Submarine shore slope.

BENCH - Bench.

OSUSHKA - (Offshore veneer) - Flat surface of the bottom beyond the outward boundary of the beach between the high and low tide line. This formation is characteristic of the coast in the regions of the mouths of the Ob and Yenisei Rivers.

LINIYA PRIBOYA - Wave mark.

PRIPLESK - nautical term for wave mark. See end of Chapter for more terms on the formation and genesis of beaches.

OT'LOGIY BEREG - Shelving shore.

OBRIVISTYY BEREG - Precipitous shore.

KRUTIK - term applied to a precipitous sandy or clay-sand beach.

YAR - another term for KRUTIK. A famous example is Oyogoskiy Yar on the southern shore of Dmitriy Laptev Strait.

KRUTOYAR - another term for KRUTIK.

OTVESHNY BEREG - Vertical shore.

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PRYAMOLINEYNY BEREK - Straight lined shore.

ROVNYI BEREK - (Even shore) - another term for PRYAMOLINEYNY BEREK.

DUGOVIDNYI BEREK - shore line the contour of which is a series of concave arcs (of large radius).

IZVILISTYY BEREK - Convoluted shore line.

BUKHTOVYY BEREK - (Embayed shore line) - another term for IZVILISTYY BEREK.

NESTONCHATTY BEREK - ("Festooned" shore) - a form between a ROVNYI and

IZVILISTYY BEREK. To this belongs the Kara seacoast from the Yenisey Zaliv to the mouth of the Pyasina.

DVOYNOY BEREK - (Double shore) - formed by peninsulas, spits, or bars.

OSTROVNOY BEREK - (Island shore) - is characterized by having islands situated along the shore.

PLOSKIY BEREK - (Flat shore) - formed by section of surf and current.

Usually outlined by the isobat. Usually bordered by deeps.

OTKRITYI BEREK - (Open shore) - characterized by deep gulfs and estuaries.

ZAKRITYIYE BEREGA - (Closed shores) - are separated from the sea by a bar or spit.

ZAMKNUTIYE BEREGA - (Locked shores) - another term for ZAKRITYIYE BEREGA.

KRUTOY BEREK - (Steep shore) - approaches the sea at an angle greater than  $10^{\circ}$ .

UGOR - a nautical term for a steep high shore, or in general the shore of a sea or river.

TOLSTIK - a nautical term for a steep high shore.

GORISTYY BEREK - (Hilly shore) - has an uneven hilly inland relief.

PRISLON - applies to a hilly or steep shore of a river, not at the very edge of the water but at some distance from it.

UVAL - (Slope) - another term for PRISLON.

GORISTYY PRODOL'NIY BEREK - (Hilly longitudinal shore) - also known as

KONKORDANTNYI (concordant), lies parallel to a mountain range.

GORISTYY POPEREGCHNYI BEREK - (Hilly transverse shore) - also known as

DISKORDANTNYI (discordant), lies perpendicular or at some angle to the general direction of mountain ranges on land.

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RAVNINNIY BEREG - (Level shore) - also known as a NEYTRAL'NIY BEREG

(Neutral shore), borders low lying, not sharply defined mountain ranges.

The shore between Ob'Guba and Yenisey Zaliv on the Gydansk peninsula is a good example of this type of shore.

PESCHANYE BEREGA - Sandy shores.

SYPUKHA - nautical term for a crumbling sandy shore.

GLINISTO-PESCHANYE BEREGA - Clay-sandy shores.

ILISTO-PESCHANYE BEREGA - Silt-sandy shores.

TORFYANOY BEREG - (Peat shore) - is a shore formed by accumulation of peat.

Found in Arctic regions close to river mouths.

KAMENISTYY BEREG - Rocky shore.

SKALISTYY BEREG - (Craggy shore) - steep shore which meets the sea in the form of crags.

SHCHEL'YE - nautical term for a smooth, sloping granite shore which has a red coloring.

LEDYANOY BEREG - (Ice shore) - steep fossil ice shores found chiefly in the Kara Sea and particularly on the shores of the East Siberian Island.

LEDNIKOVYY BEREG - (Glacial shore) - formed by glaciers coming down to the sea.

MANOSNIY BEREG - (Alluvial shore) - formed by the accumulation of sea deposits.

MANIVNOY BEREG - (Alluvial shore) - another term for MANOSNIY BEREG.

POTAMOGENNIY BEREG - (Potamogenous shore) - is formed due to the accumulation of sediment and river deposit. Occurs next to the mouths of rivers and deltas.

DEL'TOVIDNIY BEREG - (Delta shore) - formed by river deltas.

TALASSOGENNIY BEREG - (Thalassogenous shore) - formed by accumulation of sea deposits.

LAGUNNIY BEREG - (Lagoon shore) - alluvial origin, with lagoons which are separated from the sea by spits.

VYROVNENNIYE BEREGA - (Smoothed-off shores) - form an almost straight shore line, with a series of spits (PERESYP') with lagoons behind them and narrow strips of beach lying at the foot of crags. The northern shore of the Chuketsk Peninsula is a good example.

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AMFIBIYEVIDNYY BEREK - (Amphibious type shore) - the stage between a strictly alluvial shore and a KORENNOY BEREK (fundamental shore).

KORENNOY BEREK - (Fundamental shore) - part of the continent and has the same geologic structure as the continent.

FIORDOVYK BEREK - (Fjord shore) - steep long shore, with many long narrow and deep gulfs (fjord).

RIASOVYY BEREK - (Ria shore) - transverse shore, where the sea has flooded into valleys with the result that mountain ridges meet the sea in the form of capes.

SHKERNYY BEREK - (Skerry shore) - steep shore, bordered by many rocky islands.

LIMANNYY BEREK - (Estuary shore) - high neutral shore, where the sea has flooded low lying valleys, and destroyed the level contour of the continent's coast.

BEREKA TIPA MORSKOGO DNA - (Sea bottom type shores) - formed as a result of the retreating of the sea. Found on Zemlya Bunge and southern parts of the Laptev Sea.

OTMELYY BEREK - (Shoaly shore) - a shore with a developed under-water part gradually sloping down into the sea.

PRIGLUBYI BEREK - (Deep shore) - has a little-developed underwater part; drops off sharply into the sea.

KOSTISTYY BEREK - (Osseous shore) - deep steep shore with indented contours, with sharply defined capes, the continuations of which form submarine ridges and rocks extending into the sea.

It is thus possible to compile the following list of shore variations:

Method of Classification	Shore Nomenclature
According to <u>BEREGOVOY OBRIV</u> (Shore steep)	OTLOGIY (Shelving shore)
	OBRIVISTYY (Precipitous shore)
	OTVESNYY (Vertical shore)
According to <u>BEREGOVAYA LINIYA</u> (shore line)	PRIAMOLINEINYY (Straight line shore)
	DUGOVIDNYY (Arciform shore)
	IZVILISTYY (Convolute shore)
	FESTONCHATYY ("Festooned" shore)
	DVOYNOY (Double shore)
	OSTROVNOY (Island shore)

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Method of Classification	Shore Nomenclature
According to BEREGOVOY PROFIL (Shore profile)	PLOSKIY (Flat shore) KUTOY (Steep shore)
According to VNUTRENNY REL'YEF BEREGA (Back- shore relief)	GORISTYY (Hilly shore) a - PRODOL'NIY (Longitudenal shore) b - POPERECHNIY (Transverse shore) RAVNIINYY (Level shore) a - NEYTRAL'NIY (Neutral shore)
According to GRUNT (Bottom)	PESCHANYIY (Sandy shore) GLINISTO-PESCHANYIY (Clay-sandy shore) ILISTO-PESCHANYIY (Silt-sandy shore) TORFYANOY (Peat shore) KAMENISTYY (Rocky shore) SKALISTYY (Craggy shore) LEDYANOY (Ice shore) LEDNIKOVYY (Glacial shore)
According to its PROISKHOZH-DENIYU (Origin)	NAVOSHNYIY (Alluvial shore) KORENNOY (Fundamental shore) BEREGA TIPA MORSKOGO DNA (Sea bottom type shore)
According to relief of PODVODNAYA CHAST' (Submerged portion)	OTHEL'YY (Shoaly shore) PRIGLUBYY (Deep shore) KOSTISTYY (Osseous Shore)

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Insert A. Klassifikatsiya Morskikh Beregov.(Classification of sea shores).

There are several accepted methods for the classification of shores. One of the better known classifications is that suggested by F. von Richthoffen. His classification is as follows:

A. According to the form of VERTIKAL'NOGO VNESHNEGO PROFILYA (Vertical external profile) under which he includes: 1 - KRUTYYE BEREGA (Steep shore) which has the appearance of sharp terraces descending to the sea. 2 - BEREGA S PLOSKIM PLYAZHEM (Shores with flat beaches) which have KRUTYYE USTUPY (Steep terraces) lying behind them. 3 - BEREGA S SHIROKOY BEREGOVOY RAVNINOY (Shores with wide shore planes) at the foot of a cliff, and 4 - NIZMENNYYE BEREGA (Low shores) characterized by their lowness and shallow water.

B. According to the relation between the BEREGOVAYA LINIYA (Shore line) and the geological characteristic of the earth bordering the shore. Under this he includes: 1 - PRODOL'NYYE BEREGA (Longitudinal shore), 2 - POPERECHNYYE I DIAGONAL'NYYE (Transverse and Diagonal shores), 3 - Shores which are VOGNUTYYE PO KRAYAM BASSEYNOV (Concave along the edges of a basin) on the inside of mountain folds, 4 - VYSOKIY NEYTRAL'NYYE BEREGA (High neutral shores), which border flat hills, and 5 - NAMYVNYE BEREGA (Alluvial shores).

C. According to the way in which the shore has been cut up by the intrusion of the sea into the land. Under this he includes: 1 - FJORDOVYYE BEREGA (Fjord shores), 2 - DALMATSKIY TIP (Dalmatian type) which are in the form of longitudinal shores, where the sea has intruded into longitudinal valleys, so that the surrounding mountain ranges take on the appearance of peninsulas, spits, or islands lying generally parallel to the shore. 3 - RIASOVYY TIP (Ria type), 4 - LIMANNYY TIP (Estuary type), and 5 - SHKERNYY TIP (Skerry type).

D. By the result of the recession of the sea and the formation of alluvial shores: 1 - INDOKITAYSKIY TIP (Indo-Chinese type) with low lying alluvial deposits, lying between mountain ranges bordered by alluvial shores, 2 - LAGUNNYI TIP (Lagoon type), 3 - GVIANSKIY TIP (Guiana type) with alluvial strips, which form shore lines similar to the lagoon type. Formed by river deposits, 4 - PATOGONSKIY TIP (Patagonian type) if a transverse shore contains low lying areas

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between mountain ranges, 5 - TIP MORSKOGO DNA (Sea bottom type) if the shore was caused by a continuous recession of the sea, and 6 - VYRAVNENNIYE BEREGA ("Smoothed shores") caused by deposit of alluvium on a shore so as to make it even.

More recent classifications have been brought forth by Johnson (1919), and Shlyuter (1924). Johnson suggests four separate types of shore lines:

1 - BEREGA OPUSHCHENIYE (Shore lines of submergence), 2 - BEREGA PRIPODNIYE (Shore lines of emergence), 3 - BEREGA NEYTRAL'NIYE (Neutral shore lines) and 4 - BEREGA SLOZHNIYE (Compound shorelines). In addition Johnson divides shore lines as YUNIYE (Young), ZRELIYE (Mature) and STARIE (Old). \*

Shlyuter has only two classifications: MATRIKOVYE (Continental) or KORENNIYE (Fundamental) shores which include INGRESSIVNIYE (Ingressive) and BUKHTOVYE (having bays) shores, as well as ABRAZIONNIYE (Eroded) shores, whose irregularities have been removed by the washing action of the sea; and OKAYMENNIE (Bordered) shores which have the appearance of alluvial shores and can be divided into those of- a- UMERENNOGO KLIMATA (Temperate climate) such as DEL'TOVYE (Delta type), GAFOVYE (Estuary type) and LAGUNNIYE (Lagoon type), b- ZHAROGO (Torrid) or VLAZHNOGO KLIMATA (Humid climate) such as MANGROVYE (Mangrove) or KORALLOVYE (Coral) shores, c- SUKHIYE-PUSTYINNIYE (Dry-water shores) or d-SUKHIYE-POLYARNIYE (Dry-polar shores).

\*See "Shoreline Processes and Shoreline Development," D. W. Johnson, John Wiley & Sons Inc., 1919. L.C. GB 451.36<sub>7</sub>

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Chapter III. Shore Relief and Surfaces.

REL'YEF - Relief.

MAKROREL'YEF - ("Macrorelief") - the basic, main forms of relief of the earth's crust.

GEOGRAFICHESKIY REL'YEF - Geographic relief.

MEZOREL'YEF - (Mesorelief) - another term for GEOGRAFICHESKIY REL'YEF.

TOPOGRAFICHESKIY REL'YEF - Topographic relief.

MIKROREL'YEF - (Microrelief) - another term for TOPOGRAFICHESKIY REL'YEF.

FORMY REL'YEPA - Types of relief.

RAVNINA - Plain.

NIZINA - a plain small in area in comparison with the heights that surround it.

STRENDPLET - (Strand flat) - terraced surface of a coastal plain, which is separated from the shore by a sharp drop.

NIZMENNOSTI - (Low land) - areas with a level surface not more than 200 meters above sea level. These are either VNUTRENNIYE NIZMENNOSTI (Inland low lands) which are situated far inland; or BEREGOVYYE NIZMENNOSTI (Coastal low lands) which are located on the coasts of a continent.

PERESECHENNIYE MESTNOSTI - (Broken country) - characterized by large variations in the altitude of neighboring points. Positive forms of relief [under this] are NAGOR'YE, GORA, UVAL, USTUP or STUPEN' (defined below).

NAGOR'YE - (Highlands) - a general term including several types of elevated areas: PLOSKOGOR'YE (plateau), GORNAYA TSEP' (mountain chain), GORNYY KHREBET (mountain range), MASSIV (massif), and GORNAYA STRANA ("mountain country"). (See below). NAGOR'YE is distinguished as:

VYSOKOGORNOYE - (High mountain) - if above 1,500 meters;

SREDNEY VISOTI - (of medium height) - up to 1,500 meters; and

MELOKOGOR'YE - (Low highlands) - KHOLMY - (knolls).

PLOSKOGOR'YE - (Plateau) - this term may be applied to the ice covered high lands on Novaya Zemlya or Franz Joseph Land.

GORNYY KHREBET - (Mountain range) - whose GREEN' (Crown) can be either OSTRIY (Sharp); OKRUGLENNYY (Round); or PLATOBRAZNYY (Flat).

KRYAZH - (Mountain ridge) - another term for GORNIY KHREBET.

GORNIYE TSEPI - (Mountain chains) - series of mountain ranges running more or less parallel to one another. Separated by valleys (DOLINY). The point of meeting of two or more DOLINY is known as a SEDLOVINA (Saddle). At such points the range slopes sharply forming a PEREVAL (Pass).

GORNIYE OTROGI - (Mountain spurs) - are small side ranges originating from the main mountain ridge.

GORNIYE MASSIVY - (Mountain massifs) - mountainous regions (HAGOR'YE) which have no definite direction, with the same extension in length and breadth.

GORNAYA STRANA ("Mountain country"; mountainous region) - individual elevations, not separated by level areas, but with their lower parts running together to form a general elevated formation (FUNDAMENT). Exemplified by the eastern part of the Taymyr Peninsula.

GORNOYE PODNIATYE - (Mountain elevation) another term for GORNAYA STRANA.

GORA - (Mountain) - mountains are divided into:

STOLOVYYE GORY - (Table mountains), KUPOLY (Dome mountains), and PIK (Peak). Mountains with an altitude of 200 to 500 meters are known as NIZKIYE (Low), from 500 to 1500 meters as SREDNEY VISOTY (of medium height), and those above 1500 meters as VYSOKIYE (High).

SKLONY - (Slopes) - which are known as SKAT (Incline) if the angle of descent is from 15° to 20°, OBRYV (Precipice) if the slope is between 25° to 45°, and STENA (Wall) if it is more than 45°. STUPENCHATYYE SKLONY (Stepped slopes) is the term applied to slopes which have the shape of steps or terraces.

USTUP - Step.

TERRASA - Terrace.

PEREGIB - (Bend) - is the term applied to a sharp change in declivity, particularly with respect to a terraced or stepped slope.

YEDOMA - Yakut term for a rise, usually applied to the second terrace of a river bank.

YULKAN - (Volcano) - possessing a VORONKA (Funnel) or KRATER (Grater) which at times emits GORYACHIYE GAZY (Hot gases), OBLOMKI GORNYKH POROD (Rock fragments), LAVA (Lava) and PEPEL (Ash).

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**SOPKA** - local term for a more or less steeply sloped mountain with rocky summit. Often used interchangeably with Volcano (on Kamchatka). On the Arctic coast this term is applied to small mountains with ice covered summits.

**UVAL** - an elevation without a sharply defined base, with gradual and almost unnoticeable change from level plain to the slope.

**MELKOSOPCHNIK** - many small individual rises or hillocks, smooth or round in form.

**KNOLM** - (Knoll) - a small mountain (GORA) with even slopes.

**OSTANETS** - (Residual mountain) - solitary knoll or hillock standing in a plain, and appearing to be the remains of a former mountain massif.

**OSTROVNYYE GORY** - (Island mountains) - a group of several OSTANETS standing in a plain.

**BUGRY** - (Knob) - small rises on the earth's surface having steep sides.

**TORFYANYE BUGRY** - (Peat knobs) - a peculiar phenomenon found in the permafrost regions of the Arctic, in swampy localities and especially in the tundra on the coasts of the Arctic seas. Peat knobs are of various sizes, from three to four -- and even seven -- meters in height, and from five to twenty-five in diameter. The knobs consist entirely of peat, or under the peat there is a clayey-sand base, while inside the knob has a frozen center.

**BULGUNYAKHI** - Yakutsk term for BUGRY which are found along Arctic coastal tundras. They have cores of ice.

**RAYDZHARAKHI** - Yakutsk term for cone shaped, clay BUGRY which attain a maximum height of 1 - 2 meters, and are seldom more than 2 meters in diameter.

**DYUNY** - (Dunes) - usually composed of sand.

**GURIY** - man made stone cairn, placed on the shore as a land mark. Widely used in the Arctic as identification marks, especially in hydrographic work.

**SKALA** - Crag.

**KURCHAVYIE SKALI** - ("Curly crags") - series of craggy BUGRY formed on an elevation by the action of glaciers.

**BARAN' I L'BY** - (Ram's forehead) - crags in the form of an extended oval with steep slopes and level surfaces. They are of glacial origin.

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NUKATAKI - separate crags, emerging from the continental ice in Greenland.

Also characteristic for Zemlya Frants Iosif.

KEKUR - has two meanings:

1 - Cone shaped rock or crag. In this sense it is used on the entire Pacific Coast.

2 - In Siberia this term is applied to rock ridges or banks formed by the action of ice and found on the banks of large rivers,

UTES - a high, vertical precipice, composed of monolithic hard rock, or a separately towering crag.

PAKHTA - nautical term used in the Barents and White Sea to denote a rocky cliff.

KOTLOVINA - (Basin) - saucer shaped hollow in the earth's surface. It is divided into the DNO (Bottom), SHCHEKI or BOKOVYYE POKATOSTI (the side walls) which extend from the DNO to the OKRAINUSHCHEKI (lip) of the KOTLOVINA.

KARRY - hollows on lime or gypsum summits or slopes of hills, formed by the action of water dissolving part of the rock.

PROVALY - (Sunken places) - various shaped depressions on the earth's surface formed by the sinking (PROVAL) of the earth's crust as the result of the formation of underground hollows (KARSTY) and caverns by the dissolving of limestone, gypsum or salt by water.

LOSHCHINA - (Dell) - a small valley or ravine.

LOZHBINA - (Hollow) - another term for LOSHCHINA.

RAZLOG - nautical term for a LOZHBINA formation in a shore steep.

TALVEG - axis of a LOSHCHINA, or line joining the deepest portions of a LOSHCHINA.

DOLINA - Valley.

SKVOCZNYE DOLINY - (Through valley) - one which cuts through a mountain range.

VISYACHIYE DOLINY - (Hanging valleys) - valleys which open onto the sea in the form of a precipice at some height above sea level. From the sea these valleys appear to be floating or hanging.

USHCHEL'YE - (Gorge) - medium height shore USHCHEL'YE are known as RASSH-CHELINA, while in Siberia the term PADYU is applied to high sided USHCHEL'YE, flanking rivers.

TESHINA - (Gorge) - another term for USHCHEL'YE.

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QVRAG - Gully.

PASPADOK - nautical term applied to a deepening of a coastal steep so that it appears similar to a gully.

KAN'ON - Canyon.

OPOLZNI - (Earth creep) - slow displacement of a mass of loose soil containing base rock which is the result of the effect of subterranean waters.

Characteristic of Arctic coast lines during the summer.

OBVALY - (Land slide) - rapid displacement of a mass of loose soil and base rock, with a toppling of the whole mass and its disintegrating into small parts. Caused by the influence of subterranean waters.

OSYPI - (Talus) - formed on steep mountains, or shore slopes from fragments of hard rock and sand, the product of weathering. Angle of slip of OSYPI is  $27^{\circ} - 40^{\circ}$ .

KURUMA - Siberian term for streams of stone, which move slowly in narrow bands down the steep slopes of mountains from the summits which are covered with loose stone.

POCHVA - (Soil; ground) - the surface layer of land. It is divided into three main types: LEDYANAYA (Glacial), KAMENISTAYA (Rocky) and RYKHLAYA (Loose, or friable).

LEDNIKI - Glaciers.

GLETCHERY - (Glaciers) - another term for LEDNIKI.

FIRN - small ice grains which are the first stage in the formation of a glacier.

GLETCHERNYY LED - (Glacial ice) - is formed by pressure being exerted on FIRN.

GORNYYE (AL'PIYSKIYE) LEDNIKI - (Mountain or Alpine glaciers) - these are composed of two parts OBLAST PITANIYA (The region of origin) - or the snowy regions where granular snow is available for the formation of FIRN, and the OBLAST STOKA (region of flow), or the glacier itself.

DOLINNYE LEDNIKI - (Valley glaciers) - glaciers which flow down valleys to the sea.

VISYACHIYE LEDNIKI - (Hanging glaciers) - glaciers which cap the summits of high mountains and do not reach the bottom of valleys.

PROKROVNYE (MATERIKOVYYE) LEDNIKI - (Covering or Continental glaciers) - cover large areas of land. Greenland affords an excellent example.

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LEDNIKI PLOSKOGORNIY - (Plateau glaciers) - belong to the Scandinavian type continental glaciers and are a thin ice cover with a flat or wavy surface, reflecting the relief of the locality they cover.

PREDGORNYYE LEDNIKI (or LEDNIKI PODNOZHNIY) - (Base [of the mountain] glacier) - a single ice field, formed as the result of joining and confluence of separate glaciers. Sometimes these are known as SLOZHNIYE DOLINNIYE LEDNIKI (Combined valley glaciers).

OSTROVNOY LED - (Island ice) - also known as LEDYANNYE SHAPKI (Ice caps) - which is the result of ice covering small Arctic islands. An example is Ushakova Island in the Kara Sea.

SHEL'FOVYYE LEDNIKI - (Shelf glaciers) - ice caps which extend from the central part of an OSTROVNOY LED to the bottom of the sea.

NAVEYANNYYE LEDNIKI - (Heaped up glaciers) - development on rocky steep shores, descend to the water in the shape of a cliff of 10 to 20 meters height. This phenomenon is frequently met on Zemlya Frantsa Iosifa.

MERTVYYE LEDNIKI - (Dead glaciers) - those glaciers which have no movement.

LEDNIKOVIYE YAZYKI - (Glacial tongues) - characteristic of continental glaciers which descend to the shore in wide hollows. On shore these glaciers have the appearance of a low ice wall.

OSTATOCHNIYE LEDNIKI - (Residual glaciers) - remains of glacial tongues in wide hollows. At times these extend into the water in the form of low ice walls.

KAMENISTAYA POCHVA - Rocky ground.

ROSSYPI - (Rubble) - area of ground, densely covered with lumps of rock, boulders or loose stones which are the products of disintegration of rock by atmospheric processes.

KAMENNIYE MORYA - (Rock seas) - expanses of lumpy rubble, covering large areas usually on the summit of mountains. Peculiar to the polar regions.

SRECHENIYE VALY - (Gravel embankments) - formed at the foot of steep slopes, on which are located rocks. This phenomenon characteristic of the rocky shores of Novaya Zemlya.

MORENY - Moraines.

VALUHY - (Boulders) - rounded rocks up to 1 meter in diameter.

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ERRATICHESKIYE VALUNY - (Erratic boulders) - boulders which have been deposited by glaciers.

RYKHLAYA POCHVA - Loose soil.

MINERAL'NAYA POCHVA - (Mineral soil) - loose soil containing rock particles.

PESCHANAYA POCHVA - (Sandy soil) - contains up to 80% sand. This is characteristic of flat potamogenous shores (formed by river action) of Arctic Seas.

GLINISTAYA POCHVA - (Clayey soil) - contains at least 65% clay.

SUGLINOK - also a clayey soil, but a mixture of clay and fine sand.

MERGEL'NAYA POCHVA - (Marly soil) - mixture of clay (up to 75%) and lime (not less than 15%) with various other components.

GUMUSOVAYA POCHVA - (Humus soil) - contains at least 50% humus.

VECHNAYA MERZLOTA - Perma frost.

POCHVENNIY LED - (Soil ice) - closely allied with perma frost, and found everywhere where perma frost is found. Composed of separate grains, or seams of ice, which are found in moist, or water-containing, loose rock which is in a perma-frost state.

ISKOPAYEMYY LED - (Fossil ice) - also known as KAMENIY LED (Rock ice) - appearing between layers of soil and apparently preserved from the glacial period. On Bol'shoy Lyakhovskiy Island, in the Laptev Sea, such ice rises up to a wall of 35 to 40 meters above the sea.

RASTITEL'NOST' BEREGOV ARTICHESKIKH MOREY - Vegetation of Arctic Sea shores.

TUNDRA - Tundra.

POLIGONAL'NAYA TUNDRA - (Polygonal tundra) - wrinkled region characterized by multi-angular cracks.

PYATISTAYA TUNDRA - (Mottled tundra) - also known as MEDAL'ONNAYA TUNDRA (Medallion tundra) - tundra which has its surface dotted by patches of vegetation.

KOCHKARNAYA TUNDRA - (Hillocky tundra) - is a tundra whose surface (30 to 50%) is covered with small hillocks of from 30 to 50 cm. in height.

GORNAYA TUNDRA - also known as SHCHEBENCHATAYA TUNDRA (Rubbly tundra) - characterized by absence of brush and is clear of mossy growth. Vegetation does not form a continuous cover, but only occurs here and there in tufts among the rubble.

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**RASTITEL'NAYA TUNDROVAYA ZONA** - (Tundra vegetation zone) - zone in which tundra vegetation exists.

**PODZONA YUZHNOY LESOTUNDRY** - (Sub-zone of the Southern forest tundra) - is the transition zone from the forest zone to the tundra zone. Includes the coasts of the White Sea south of the Arctic Circle and of the southern part of Cheshskaya Guba on the Barents Sea.

**PODZONA SEVERNOY LESOTUNDRY** - (Sub-zone of the northern forest tundra) - covers the Murmansk coast, the Kola peninsula, and the shores of the northern part of the Kanin peninsula.

**PODZONA KUSTARNIKOVOY TUNDRY** - (Sub-zone of the brush tundra) - completely without tree cover, overgrown with willows and YERNIK on the slopes of hills, and in low places and unflooded river terraces bogs are formed and lakes are often found. Areas free of brush are occupied by moss and lichen tundras. This zone occupies the northern part of the Kanin peninsula, the Timan coast, the shores of the southern part of Baiderat-skaya Guba and Obakaya Guba. Farther to the east the brush tundra is found especially on the right shore of the Yenisey River delta, on the western shore of Khatanskiy Zaliv and is found on the coasts of the Laptev and Eastern Siberian Seas from the mouth of the Olenek to Chauanskaya Guba.

**PODZONA LISHAYNIKOVO-MOKHOVOY TUNDRY** - (Sub-zone of the lichen and moss tundra) - typical form of the treeless tundra, where brush is seldom found, only on slopes well protected from the cold in winter by snow. The brush-covered area is less than 10%; the area of swamps and lakes is limited to 25%. The lichen and moss tundra is on Kolguyev Island in the Barents Sea, on the shores of Yugorskaya peninsula, Bayderatskaya Guba, the central part of Obakaya Guba, and the delta of the Yenisey, and in other areas.

**PODZONA ARKTICHESKOY TUNDRY** - (Sub-zone of the Arctic tundra) - is characterized by a complete absence of brush, the prevalence of polygonal forms of tundra, and a scant growth of lichens on sandy or gravelly ground.

**SNEGOVAYA ZONA** - (Snow zone) - includes the northernmost parts of the islands of the Arctic Ocean. This zone is divided into the following two sub-zones.

**PODZONA ARKTICHESKOY PUSTYNI** - (Sub-zone of the Arctic waste) - is the southern sub-zone of the snow zone. Here glaciers either do not exist, or are found

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only to a slight extent. The greater part of the area is occupied by polygonal and rubbly tundra, with sparse vegetation in the ravines and along the fissures.

**PUSTYNO-LEDNIKOVAYA PODZONA** - (Waste-glacial sub-zone) - characteristic of the mountainous islands of the Arctic Ocean, the greater part of its area is covered by glaciers and neve fields (PIRNOVYYE POLYA). Vegetation is found on this terrain only on a narrow strip of the coast and on the flat lowlands on polygonal or rubbly tundra.

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Chapter V. The Surface of the Sea.(The Sea Levels, Currents, Wave Action and Other Phenomena).

UROVEN' OKEANA - (Ocean Level) or UROVEN' MORYA (Sea level) - is the result of a number of forces: gravity, centrifugal force, atmospheric pressure, etc.

PERIODICHESKIYE KOLEBANIYA UROVNYA MORYA - (Periodic variation in sea level)

GODOVOY KHOD UROVNYA - (Annual  $\sqrt{\text{sea}}$  level regime) - periodic fluctuation of sea level during the year.

VEKOVY KHOD UROVNYA or MKOGOLETHIY KHOD UROVNYA - (Perennial  $\sqrt{\text{sea}}$  level regime) - level variations over a period of many years. This is usually the result of the submergence or emergence of coasts.

PRILIVY - (Tides) - which are divided into PRILIV (Incoming tide) and OTLIV (Outgoing tide). The highest point reached by the PRILIV is known as POLNAYA VODA (High water) or flood tide, while the lowest point reached by the OTLIV is known as MALAYA VODA (Low water) or ebb tide. The term PERIOD PRILIVA (Tide period) is applied to the interval between two high tides, and the AMPLITUDA PRILIVA (Tide amplitude) is the term applied to the difference in levels between a high tide and the low tide immediately following. The average level variation is known as SREDNYAYA AMPLITUDA (Average amplitude).

POLUSUTOCHNYE PRAVIL'NYE PRILIVY - (Semi-diurnal regular tides) - consist of two flood and two ebb tides every lunar day. The period between the two flood tides is exactly equal to the period between the two ebb tides.

NEPRAVIL'NYE POLUSUTOCHNYE PRILIVY - (Irregular semi-diurnal tides) also known as NESIMMETRICHNYE (Asymmetrical) - are characterized by having variable periods between the two flood or ebb tides. Sometimes the periods are so varied that there are four flood and four ebb tides in a 24-hour period. Such a phenomenon is known as DVOYNYE POLUSUTOCHNYE PRILIVY (Double semi-diurnal tides).

VODA - (Water) - nautical term applied to the period between flood and ebb tide (about 6 hours), and also to the distance which an oar-powered boat can cover during this period (about 30 kilometers).

SUTOCHNYE PRILIVY - (Diurnal tides) - are characterized by one flood and one ebb tide, with several SMESHANNYE PRILIVY (mixed tides) every twenty

four hours.

SMESHANNIYE PRILIVI - (Mixed tides) - characterized by large variations in the amplitude or period between two flood and ebb tides.

NERAVENSTVO PRILIVOV - (Irregularity of tides) [literally "inequality"] - deviations of moments, amplitudes and periods from the average.

FAZOVOYE NERAVENSTVO - (Phasal irregularity) or POLUMESYACHNOYE NERAVENSTVO (Semi-monthly irregularity) - are related to the lunar periods. They are divided into PRILIVI V SIZIGII (Syzygy tides) when the amplitude is greater than average and PRILIVI V KVADRATURY (Quadrature tides) when the amplitude is less than average. The term LUNNY PROMEZHUTOK (Lunar interval) is applied to the interval between the culmination of the moon and the occurrence of the next flood tide.

SUTOCHNOYE (TROPICHESKOYE) NERAVENSTVO - (Diurnal [tropical] irregularity) is the irregularity of the tides caused by the declination of the moon with reference to the Equator. In such tides there can be noticed NERAVENSTVO PO VYSOTE (Irregularity in height) and NERAVENSTVO PO VREMENI (Irregularity in time). Tides with most marked daily irregularities are known as TROPICHESKIYE (Tropical), while those with the least daily irregularity are known as (RAVNODENSTVENNIYE (Equinoctial).

PARALLAKTICHESKOYE NERAVENSTVO PRILIVOV - (Parallactic tide irregularities) or MESYACHNOYE NERAVENSTVO PRILIVOV (Monthly tide irregularities) - are caused by variations in the distance between the earth and moon. This period is from Perigee to perigee (PERIGEYA).

VOZRAST PRILIVA - (Tide increase) - In the 12 hour tide we can distinguish an interval of time between the new or full moon and the onset of the syzygy tides. This interval is usually around  $1\frac{1}{2}$  days (36 hours) but at times may vary  $\pm 7\frac{1}{2}$  days (SUTKI).

PRIKLADNOY CHAS - (Applied hour) - is divided into: 1- SREDNIY PRIKLADNOY CHAS (Average applied hour) which is equal to the average lunar interval, and 2- the PRIKLADNOY CHAS PORTA (Applied hour of the port) or the average length of the lunar interval at syzygy, when the Sun and Moon have an inclination equal to zero (0), and are at an average distance from the earth.

ZAZHIVAYET VODA - ("The water is beginning to live") - nautical expression meaning that the water has begun to rise after an ebb tide.

ZAPALA (DROGNULA, ZARUBILA) VODA - ("The water has gone down /been jarred, nicked") - nautical expression meaning that the water has begun to fall after the ebb tide.

NOVCHEVA - nautical term for a syzygy tide.

SUKHAYA VODA - (Dry water) - nautical term for shallow water caused by an ebb tide, or the lowest fall during ebb tide, or that area of the shore which is bared during ebb tide.

PALAYA VODA - ("Fallen water") - nautical term for low water, ebb tide, or the outgoing tide.

POLVODY or TRET'VODY - (Half-water, or one-third water) - half and one third of the incoming tide, or flooding tide above the level of low water.

METEOROLOGICHESKIYE PRILIVY - (Meteorological tides) - are the fluctuations in the sea levels due to the influence of wind, atmospheric pressure, temperature, etc.

BAKAT - (Bore) - term applied on the Mezen River and other White Sea rivers to the phenomenon when a tidal wave hits a wide and open river mouth, stopping the current and forming a high wave which moves upstream as a wall of water, sometimes several meters in height. This is known as "bore" on the Ganges, on the Seine as "mascaret", and as "pororoca" on the Dordon in France and the Amazon.

MANIKHA - phenomenon observed on the Severnaya Dvina River at Arkhangel'sk caused by individual incoming tides, whereby there is a sudden drop in the water level about half way through a flood tide. After this drop the water rises again.

POLNOVA - nautical term applied to flood tide after a MANIKHI. This is also known as BOL'SHITSA.

NEPERIODICHESKIYE KOLEBANIYA UROVNYA - (Aperiodic variations in the level) - caused mostly by the water being driven by winds, but also caused by sudden showers or changes in atmospheric pressure.

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**NAGON I SGOH VODY** - ("Driving in and driving off of water") - increase of water on the shore above the average level caused by the wind driving in more water, is known as **NAGON**, while the driving off of water or **SGOH**, causes the water level to fall below the average level. Most noticeable on seas or water bodies which have pushed deep into the continent.

**NOMENKLATURA UROVNEY** - (Nomenclature of levels) - levels are distinguished as **GLAVNIYE** (Principle or primary) and **NAVIGATSIONNIYE** (Navigational). The first is important for the compilation of charts and for hydrographic research; the second, for navigation. Among the **GLAVNIYE UROVNI** there are: **DEYSTVIYUSECHIIY UROVEN'** (Actual level) or **MOMOVENNIY UROVEN'** (Momentary levels) - applied to the level in effect at the moment.

**SREDNIY UROVEN' MORVA** - (Average sea level) - which can be either **SREDNIY GODOVYX** (Annual average) or **SREDNIY MEGOLETHIY** (Perennial average). The minimum period of observation necessary for determination of the perennial average is an even 19 years, i.e., the period of the change of the greatest declination of the moon within the limits of  $18^{\circ}19'$  and  $28^{\circ}35'$ . A series of observations over a period of less than 19 years gives **PRILISHENNIY SREDNIY UROVEN' MORVA** (approximate average sea level). A series of hourly observations for 30 or 15 twenty-four hour periods results in a **SREDNIY MESYACHNIY OTSCHET PO FUSHTOKU** (Average monthly reading on the tide gauge). The average height of flood and ebb tides is known as **SREDNIY UROVEN' POLUPRILIYA** (Average level of a half-tide).

**ORDINAR** - the tide level which has the greatest re-occurrences.

**NUL' GLUBIN** - (Zero depth) - that level from which all depths are calculated for purposes of chart depth readings. Usually the perennial average level is taken as zero depth.

**NUL' FUSHTOKA** - (Zero on the tide gauge) - that level of the sea when the tide gauge shows zero.

**NAVIGATSIONNIYE UROVNI** - (Navigation levels) - are those which are important from the navigation stand-point. Under this are classed **POLNAYA SIZIGIYNAYA VODA** (Full syzygy tide), **MALAYA SIZIGIYNAYA VODA** (Low syzygy tide), **POLNAYA KVADRATURNAYA VODA** (Full quadrature tide), and **MALAYA KVADRATURNAYA VODA** (Low quadrature tide).

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MORSKIYE TECHENIYA - (Sea currents) - are classed according to their:

1- method of generation; 2- stability; 3- physical properties; 4- distribution in the depth of the sea; and 5- movement. The elements of a current are the NAPRAVLENIYE (Direction), SKOROST' (Speed) and ISTOYCHIVOST' (Steadiness).

VEYTRVOYE TECHENIYE - (Wind current) - also known as DREYFOVOYE TECHENIYE (Drift), appears on the surface of a sea and is caused by the action of winds.

PRILIVO-OPLIVNOYE TECHENIYE - (Flood-ebb current) --has a periodic character and is dependant on flood and ebb tides. They are at their greatest intensity at syzygy, and such currents cause most of the ice-breakup in the Arctic Ocean.

POPUTNAYA VODA - (Favoring sea) - is a nautical term applied to either a flood or ebb current which is heading in the same direction as a vessel.

SMENA TECHENIY - (Shift of current) - change of a PRILIVNY current to an OTLIVNY current and vice versa. Observed mostly in narrow straits.

PROTEYAYA VODA - (Mild sea) - nautical expression for the appearance of the sea's surface at the moment of current shift.

STOGHNOYE TECHENIYE - (Flow currents) - are formed as the result of the flow of excess water into one part of the sea, as from a river. A STOGHNOYE TECHENIYE may be steady, periodic or temporary.

KOMPENSATSIONNOYE TECHENIYE - (Compensatory currents or Reaction currents) - compensate for subsidences occurring in any part of a sea due to any number of reasons. These may be steady, periodic and temporary. In the Arctic a GLUBINNOYE or PRIDONNOYE KOMPENSATSIONNOYE TECHENIYE (Deep or bottom reaction current) can be observed.

KONVEKTSIONNOYE TECHENIYE - (Convection currents) - result due to differences in the density of the sea water of the same level in various parts of the sea. This difference can be caused by differences in temperature, salinity, or vaporization, etc.

BAROGRADIYENTNOYE TECHENIYE - (Pressure currents) - caused by variations in the sea level due to changes in atmospheric pressure.

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SUBMARINNYE TECHENIYA - (Composite [literally "summary"] currents) - usual state of ocean and sea currents. Most of the previously mentioned currents are not observed in their pure state but rather in combination with other currents.

POSTOYANNOYE TECHENIYE - (Constant currents) - might be called a planetary current, and is characterized by constant direction, average speed, and extent year in and year out. The Gulf Stream is a good example.

VREMENNOYE or SLUCHAYNOYE TECHENIYE - (Temporary or occasional current) - is the result of temporary phenomena and does not last long.

PERIODICHESKOYE TECHENIYE - (Periodic current) - is a current which changes periodically by reversing its direction. Typical of PERIODICHESKOYE TECHENIYE are the MUSSONNYE TECHENIYA (Monsoon current) of the Indian Ocean, which during the summer head in a direction opposite to that in winter.

TEPLOYE TECHENIYE - Warm current.

KHOLODNOYE TECHENIYE - Cold current.

POVERKHNOSTNOYE TECHENIYE - Surface current.

GLUBINNOYE TECHENIYE - (Deep current) - is found in the depths of a sea and is not observed on the surface. It often flows in a direction opposite to surface currents.

PRIAMOLINEYNOYE TECHENIYE - (Straight [line] current) - is a current which flows more or less in one direction. The Gulf Stream and the Ob'-Yenisey current are good examples.

TSIKLONICHESKOYE TECHENIYE - (Cyclonic current) - is almost closed circular currents moving in a counter-clockwise direction. This type of current is seen very frequently in Arctic Seas.

ANTI-TSIKLONICHESKOYE TECHENIYE - (Anti-cyclonic current) - is almost closed circular currents moving in a clockwise direction. This current is observed in the Central Arctic Basin.

SGONNOYE I NAGONNOYE TECHENIYA - Wind currents. (Cf. NAGON I SGON, above).

OTZHEMNOYE TECHENIYE - ("Pushing away current") - is a current which moves away from the shore and will drive a vessel away from the shore. It may be called a counter current in depth.

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PRIZHIMNOYE TECHENIYE - ("Squeezing current") - is the opposite of OTZHIMNOYE TECHENIYE, and moves toward the shore, either directly or at an angle to it.

OKHODNOYE or ODIENNOYE TECHENIYE - (By-passing or bedding current) - are currents observed at capes jutting into the sea, or around islands situated in the path of a current.

PROTIVOTECHENIYE or OBRATNOYE TECHENIYE - (Counter currents) or (Reverse currents) - currents originating in a central strong current but branching off and flowing in a direction opposed to the main current. This type of current is also known as a FRUKTSIONNIY (Friction) current.

SPORNIYE TECHENIYA - (Conflicting currents) - is the term applied to two currents meeting one another. Usually there is a formation of SULOY (Rips) along the borders of these currents.

BOKOVAE TECHENIYE - (Side currents) - currents which flow perpendicular to the course of a ship.

VODOVOROT - Eddy currents.

ULOVO - nautical term used on Siberian rivers to denote eddies which are formed by the current behind promontories and capes.

V'YUN - nautical term for eddy current.

SULOY - Rips.

KUMORA - nautical term for the band of quiet water lying between the shore and the point of re-meeting of two currents by-passing an island. Found around islands situated in regions having strong currents.

SLIV - term applied to the sea surface, in the vicinity of a current which is distinguished from the calm sea surface by the presence of scum, eddys, etc. This phenomenon is used by pilots to determine the direction of a roadstead in a river delta.

STREZH (STREZHEN') - a stream on the surface of a river, which has a greater rate of flow than the rest of the river, and is flowing along the deeper part of the river.

VOLNA - Wave.

VOLNY. VOZNIKAYUSHCHIE OT DEYSTVIYA VETRA - (Waves, caused by the action of the wind) - wind waves are divided into GLAVNIYE (Primary) and

VTOBOSTEPENNIYE (Secondary).



ELEMENTY VETROVYKH VOLN - (Elements of wind waves) - are the VERSHINA (Top) or GREBEN' (Crest) of the wave, the PODOSHVA VOLNY (Foot of the wave) while the part of the wave between crest and foot is known as the SKLON (Slope). The data which characterize waves are DLINA (Length), VYSOTA (Height), PERIOD (Period) and SKOROST' RASPROSTRANENIYA (Speed of dispersion) of waves. NAPRAVLENIYE VOLNY (Direction of waves) is another important characteristic of waves.

SREDNAYA KRUTIZNA VOLNY - (Average slope of a wave) - is the angle to the horizon formed by a line joining the crest to the foot of the wave.

RAZMERY VETROVYKH VOLN - (Dimensions of wind waves) - the average dimensions for storm waves are as follows: height 7 - 8 meters, length 150 meters and a period of 6 - 10 seconds.

TIPY VOLN VYZVANNYKH VETROM - (Types of waves, caused by wind). The following eight are examples.

VETROVAYA (Wind) or VYNUZHDENNAYA (Forced) - waves are the direct result of the affect of wind.

ZYB' (Swell) - a regular, fixed type of wave with a sloping side and a top without a sharp crest and without foam (BARASHKI - the breaking crest of a wave). ZYB' is observed after the cessation of wind or after a change in its direction, and appears then as a type of free (SVOBODNAYA) wave, in contrast to the restricted (NESSVOBODNAYA) waves which are formed by the direct action of the wind on the surface of the water. ZYB', as a system of waves coming one after another may spread on the surface of the sea far beyond the limits of the region of their origin, and in this case are called "MERTBAYA ZYB'" (dead swells).

KOLYSHEN' - nautical term for dead swells.

OGLOBEN' - nautical term for dead swells before and after a storm.

OGIBEN' - nautical term for swells arising from which roll into a gulf, a bay or the backwater behind a cape.

POVIDEN' - nautical term for a sloping, inclined roller (VAL) in a sea or on a river.

RAZBITAYA VOLNA - (Broken wave) - observed in shallow water, on the movement of waves from deep areas.

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INTERFERIROVANNIYE VOLNY - (Waves of interference) - is a complex system of waves which are of different sizes, one superimposed on another.

FORMY VETROVYKH VOLN - (Forms of wind waves) - are of the following four types.

RYAB' - Ripples.

TRIKHBEREZHNYE (Triple) or NEPRAVIL'NIYE (Abnormal) - waves which are disposed on the sea surface in a staggered order, with the crest of one wave in close to the foot of the preceding wave. Average intensity wind waves belong to this type. May be called Intersecting waves.

PRAVIL'NIYE VOLNY - (Normal waves) - is a system of waves which have long spacing between the crest of one wave and the foot of the preceding wave.

TOLCHEYA - steep waves which have sharp crests and have the appearance of individual mounds. These are usually formed by the deflection of waves by a beach shore on the sides of a pier.

BURUNY - (Breakers) - wave breaking on banks or reefs at a distance from the shore.

SSECHET - term applied to the breaking up of a wave crest when it hits a steep submerged rock.

PRIBOY - Surf.

VZEROS - is formed by the surf when a large wave hits a steep shore, or the side of a sea wall, pier or mole. This water may reach a height of seven times the height of the wave.

UDAR VOLNY - Wave thrust.

KALENA - term applied to the constant surf observed on the shores of Guinea, having, however, seasonal variations in intensity.

VOLNY OT ZEMLETRASENIYA - (Earthquake waves) - are called either SEYSMICHESKIYE (Seismic) or DONNIYE (Bottom) waves. Destructive waves of seismic origin are called TUNAMI [presumably from the Japanese "TSUNAMI"].

STOYACHEYE VOLNY - (Standing waves) or SEYSHI - ~~Seiches~~. These are particularly noticeable in closed basins, such as lakes.

"MORSKOY MEDVED" - ("Sea bear") - is a term borrowed from German Baltic fishermen who use the term "Seebär" to describe waves of short duration. Stevenson applied the term SHTORMOVOY PRILIV (Storm tide) to "Seebär" which he observed in the Beaufort Sea.

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**VOZVANYE ZAYBY** - (Water rabbits) - term applied to water spouts.

**VNUTRENNIYE VOLNY** - (Internal waves) - are formed in the depths of the sea and are not noticeable on the surface.

**MERTVAYA VODA** - (Dead water) - a phenomenon observed in the Arctic Seas. A ship loses speed sharply and almost comes to a stop in spite of the normal operation of the engines. This arises from the occurrence of internal waves at the boundary between two layers of water of different densities. All the energy of the propeller goes into the creation of these waves; hence the ship loses speed. The phenomenon of "dead water" is possible where there is a surface fresh water layer of a depth about equal to the draft of the ship.

**PROZRACHNOST' MORYA** - Transparency of the sea.

**TSVET MORYA** - Color of the sea.

**TSMETENIYE MORYA** - Coloring of the sea. A phenomenon brought about by turbulent disturbance of planktons in the upper layers of the sea. As a result the color, as well as transparency may be changed.

**SVECHENIYE MORYA** - (Luminescence of the sea) or **SVERKANIYE V MORSKOY VOZE** ("Glittering in the sea water"). This luminescence or glitter is caused by various bacteria, planktons, or even such marine animals as shellfish or jelly-fish.

**TEMPERATURA POVERKHNOSTI VODY** - (Temperature of the water surface).. There are five basic temperature regions in the world: **TROPICHESKAYA** (Tropical); **ARKTICHESKAYA** (Arctic); and **ANTARKTICHESKAYA** (Antarctic); the **BORKAL'NAYA** (North Temperate); and **NOTAL'NAYA** (South Temperate) **OBLASTI** (Regions).

**SOLENOST' MORSKOY VODY** - Salinity of sea water.

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## Chapter VI. Ice

- VIDY ARKTICHESKIH L'DOV - (Types of Arctic ice) - these are classified according to their FRIOSKOZHENIYE (Origin) and to their FORMA OBRAZOVANIYA (Kind of formation). They are also divided into DREYFUZHCHIYE (Drifting) and NEPODVIZHNIYE (Fast).
- MORSKOY LED - (Sea ice) - water temperature usually has to be around  $-1^{\circ}.9^{\circ}\text{C}$  for this type of ice to start forming.
- IGOL'CHATYY LED - (Needle ice) - is composed of ice crystals shaped like regular six-sided pyramids, whose axes are perpendicular to the sea level. It forms a glassy surface.
- GUBCHATYY LED - (Spongy ice) - is composed of a criss-crossing in various directions of ice flakes, grains and needles.
- ZERNISTYY LED - (Granular ice) - is formed of spherical ice grains or rounded ice crystals with irregular axes.
- PALEOKRISTICHESKIY LED - (Paleochristic ice) and DR'EVNEKRISTALLICHESKIY LED (Old crystalline ice) - are two more forms of MORSKOY LED (Sea ice).
- POVERKHNOSTNIY LED - Surface ice.
- GLUBINNIY LED - (Deep ice) - ice which is formed at some depth below the surface of the water. It is usually GUBCHATAYA (Spongy) in form.
- DONNIY LED - Bottom ice.
- TSVET L'DA - Color of the ice.
- YASNETS - Nautical term for transparent ice.
- GLETCHERNYY LED - Glacier ice.
- AYSBERG or LEDYANAYA GORA - Ice berg.
- RECHNOY LED - River ice.
- DREYFUZHCHIIY or PLUVUSHIY LED - Drifting.
- NEPODVIZHNIY LED (Fast ice) or BEREGOVOY PRIPAY (Coastal land flow) - formed in winter as a result of ice freezing to the coast. Often drifting ice freezes onto this fast ice.
- LEDYANOY ZABEREG - (Ice fore-shore) - primary stage in the formation of fast ice. It is a fast thin ice layer, which freezes to the shore.
- PODOSEVA L'DA - (Ice foot) or ZALIVNOY PRIPAY (Gulf land flow) - is that part of the fast ice which does not rise or fall with the tides.

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- SIKOZAK - term applied to stratified, very thick, old ice which forms as fast ice in bays and gulfs.
- OSTATOCHNIY DONNIY LED - (Residual bottom ice) - is that part of fast ice which remains frozen while the rest of the fast ice is thawing or getting covered by water. Residual bottom ice is usually found in shallow water.
- LEDYANYE IGLY - (Ice needles) - the first phase of the formation of ice in the sea.
- LEDYANOYE SALO - Slush.
- SALYANKA or LEDYANAYA KORKA - (Ice rind or crust) - one form of MOLODOY LED (Young ice) which forms when the water is calm. Usually formed by the freezing of slush. Ice crust breaks easily into fragments known as PALABAZHENIKI. These have a glassy appearance.
- BLINCHATY LED - (Pancake ice) - it is also known by the term TARELOCHNIY ("Little plate"), or LEPESHKI (Pastilles).
- SNEZHURA - (Snow slush). The nautical term for SNEZHURA is BAKALDA. The terms KALTUZHNIK, SHEL'PYAK or SHEL'PYACHOK are applied to floating clots of frozen snow.
- SHUGA - Sludge ice.
- MOLODIK or BEZUN - Young ice. It is usually heavily water logged.
- MOLODOY ROVNIY LED - (Young level ice) - is formed by the freezing together of the primary forms of ice like ice rind, sludge, or slush. KOLEDUKH is the nautical term for smooth ice while GLADTSA is the nautical term for a smooth floe.
- NILAS - loose, young ice, water logged and greyish in color due to water which accumulates on its surface.
- RITTY LED - (Broken ice) - floating ice pieces; resulting from the breaking up of larger pieces of ice or ice fields. This comes in two forms MELKOBITY LED (Fine broken ice) or MALYYE L'DINY (Small floes) and KRUPNOBITTY (Coarse broken ice) or KRUPNIYE L'DINY (Large floes).
- SMOROZI - strengthened young level ice which has been formed by the accumulation of young ice, and has not undergone any mechanical action. The term is also applied to broken ice which freezes into a compact ice field. The latter is characteristic in Arctic seas at the beginning of the winter period.
- LEDYANYE POLYA - Ice field.

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- OBLONKI LEDYANYKH POLEY - (Fragments of ice fields) - floes formed as a result of the disintegration of ice fields or fast ice.
- MESYAK - separate large piece of flat sided ice with small horizontal dimensions and usually found floating.
- TARTYSHI - (Growlers) - separate floes, fragments from fairly large ice fields, from one to several meters in extent, often worn smooth by waves. The floes with flat surfaces are known as KOLTAKI. Heaped up floes are known as TARTYSHI. TARAN or PODLAZ is the term applied to that part of a growler which is found under water and KARNIZ is the part showing above water. KARNIZ on floating floes are classified according to the shapes they take. They either form LEDYANYE GRIBY (Ice mushrooms) or LEDYANYE LILII (Ice lilies) or LEDYANYE UTKI (Ice ducks).
- STAMUKHA - Grounded floeberg.
- SHIKHANY - nautical term for STAMUKHI.
- STOYKA - another nautical term for STAMUKHA or for a piece of ice grounded on a shoal.
- LEDYANYE OSTROVA - (Ice islands) - term applied to large size STAMUKHI. Have more than 10 meters visible above water.
- BUKHTOVYI or REYDOVYY LED - (Bay ice) - forms close to shore in bays or gulfs.
- LEDYANAYA KASHA - (Slob ice) - in nautical terminology it is known as PULG, ZABOY, ZATOR, TERTYUKHA, and by several other terms.
- PAK - (Pack) - is divided into ARKTICHESKIY PAK (Arctic pack) found in the central Arctic basin and OKRAINNIY PAK (Boundary pack) or the pack which borders Arctic seas.
- TOLCHENNY PAK - (Thick pack) - accumulation of broken old ice. Observed on the borders of the central Arctic basin.
- AYSBERG or LEDYANAYA GORA - Iceberg.
- PADUN - nautical term for an iceberg.
- SHCHENOK - nautical term for a small fragment of floating glacier ice.
- FLOBERGI - (Floebergs) - compact floes formed from paleoclastic ice, and having the appearance of ice of glacial origin but actually being formed by the freezing of floating sea ice.

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POVERKHNOST' LEDYANOGO POKHOVA - Surface of an ice cover.

TOROSY - (Hummocks). There are two ways in which hummocks are formed:

1- by YZLOM (Break-up) and 2- by RAZDROBLENIYE (Crumbling) of the ice cover.

An ice cover which contains many hummocks is described as TOROSISTIIY (hummocky), and the degree of hummocking is reported on the basis of a 5 ball scale. There are various coastal terms for hummocks, some of these are: KEKUR, STOSYA, LOWY, ZALOMY, NALOMY, or KHRAPY.

PRIBREZHNIYE TOROSY - (Coastal hummocks) or BAR'YERNIYE TOROSY - (Barrier hummocks) - are formed on a coastal land floe or near its edge due to the driving of ice onto the shore, a reef, or sand bar. This type of hummock builds up to greater heights than the hummocks which appear out at sea.

MORSKIYE TOROSY - (Sea hummocks) - are formed out to sea due to the piling up of ice drifting in the sea. The underwater part of hummocks is known as ROSCYA ROPAKI - term applied to hummocky ridges of ice standing in a level ice area, or else hummocky ridges of more than average height standing in a rough ice area. RUBAKI is the nautical term for ROPAKI, while the term KOTLY is applied to several ROPAKI which freeze together and are forced up due to the pressure of the surrounding ice. When ice heaps up to form ROPAKI, in nautical terminology they say: "ROPOCHIT'" - "ROPAKI are forming". This phenomenon is limited to fairly thin ice.

PRILIVNOY GREBEN' - (Tidal ridge) or BEREGOVOY GREBEN' (Coastal ridge) - is ice which has been pushed onto the shore by tide, currents or ice pressure. In the White Sea such accumulations reach heights of 15 meters or more. This process of the pushing of ice onto a shore is also known as ZABOY.

LEDYANIYE SHATRY - (Ice huts) - Heavy layers of ice, accumulating on such a place, naturally bulge up and crack. In the center of the bulge an aperture is formed, resembling the crater of a volcano, then radial cracks, with diverging tops and joined bottoms, and finally, encircling cracks on the periphery whose upper edges are compressed and whose lower edges are spread out. SHATRY attain a height of up to five or six meters. In winter ice huts may also be formed on the surface of floating ice cover due to compression of the ice.

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LEDYANYE VALUNY - (Ice boulders) - are pieces of thawing ice on an ice cover. In the Yakutsk region this phenomenon is known as BUSBOLDOK.

TERTIY LED - (Rubbed ice) - white powdery ice mass, which can be differentiated from snow by its slightly greyish tinge. Formed due to the friction of pieces of ice rubbing against one another. Generally found at the ice edge.

TRESHCHINY NA L'DU - (Cracks in the ice) - are formed by the action of wind, fluctuation of the sea level, temperature changes, and other reasons. These TRESHCHINY are divided into SKVOZNIYE TRESHCHINY (Through cracks) and MESKVOZNIYE TRESHCHINY, or those cracks which are not as deep as the width of the ice cover.

PRILIVNYE TRESHCHINY - (Tidal cracks) - form in a coastal land floe, between its seaward and shoreward parts. These tidal cracks are divided into VNUTRENNIYE (Inner) and NARUZHNIYE (Outer) cracks. The VNUTRENNIYE cracks form between the shoreward belt of the land floe (or the ice foot) and that part which comes to rest on the bottom only at low tides. The NARUZHNIYE cracks form between that part of the ice cover which rests on the bottom only at low tide and that part which is always afloat. These cracks are related to sea bottom relief, and thus permit a charting of sea bottom topography by proper interpretation of these tidal cracks.

SGONNO-NACONNIYE TRESHCHINY - (Wind tide cracks) - See Chapter 5 - are observed in a coastal land floe, and are the result of rise and fall of the level caused by the influence of wind. In most cases these coincide with tidal cracks.

NALEDI - also known as TARYH in the Yakut language, are phenomenon observed frequently in the permafrost region. They are formed as follows. The winter ice cover of rivers exerts pressure on the river water flowing beneath this cover. The water sets up a counter pressure. The ice cover cracks and the water wells up and freezes. But more water wells up through the crack which has been made, and freezes, increasing the size of the ice hump. Such humps are known as NALEDI. These ice BUGRY (knobs) can also form in the soil, in river valleys as well as on ice covering the sea surface.



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NASLUD or KOCHKA - are terms applied to thin ice which forms on the surface of water pools in an ice cover. These water pools are the result of rain or thawing of the ice cover. This phenomenon is limited to the early spring.

SOLOMCHAK or RASSOL' NA L'DU - (Salt-water or Brine on the ice) - is a mixture of crystallized salt, snow and water, which has congealed into a slushy form. This is usually found on the surface of an ice cover and hinders walking and the passage of sledges.

LEDYANIYE TSVETI - (Ice flowers) - reach heights of 3 to 4 cm. and are observed on the surface of sea ice. They are ice and salt crystal formation.

SNEG NA LEDYANOM POKROVE - (Snow on an ice cover) - wind effects this snow by producing hollows and mounds, which are called ZASTRUGI. Frequently due to repeated thawing and freezing an ice rind called SLUD is formed on the top surface of this ice cover.

SHEZHNIKA - term applied to fresh water, the result of thaw, which is found on the top of an ice cover. Such pools are often utilized by ships to replenish their fresh water supply.

VODYANOY ZABEREG - is the term applied to a band of water on ice bordering a beach. It results in spring due to the thawing of snow on the ice, thaw of the ice itself, or fresh water from the shore caused by melting snows. When the ice close to shore thaws completely a SKVOZNOY (Through) VODYANOY ZABEREG is formed, with water extending all the way to the bottom.

OZERA I PRUDY NA L'DU - (Lakes and ponds on the ice) - is the result of the accumulation on the ice cover of water caused by the melting of snow, or of the ice cover itself.

PROVALINY - Holes.

PROMOINY - through cracks in an ice cover which were caused by currents.

Usually observed in straits having fast currents.

NAVIGATSIONNIYE KHARAKTERISTIKI L'DOV - navigational characteristics of ice are of great importance to the Arctic mariner. Points of interest include the type of ice, its amount, types of water areas between ice patches, etc.

LEDVITOST' MORYA - the amount of sea covered by ice, particularly during the navigation season.

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- MOLODOY LED - (Young ice) - it appears in various forms, among them SALO (Slush), BLINCHATTY LED (Pancake ice), SKLYANKA (Ice rind), etc. This MOLODOY LED can be of OSENNEGO (Autumnal), ZIMNEGO (Winter) or VESENNEGO (Spring) PRISKHOZHDENIYA (Origin).
- GODOVALY LED - (Yearly ice) - is formed during the early part of fall and lasts throughout the winter. It may attain thicknesses of 1 to 25 meters.
- MNOGOLETNIY LED - (Perennial ice) - is ice which does not thaw in summer and which is at least two years old. It is usually more than two meters thick and is the basis of the ice pack.
- TYAZHELYY LED - (Heavy ice) - is the term applied to close hummocky ice which presents difficult passage even to the most powerful of ice breakers. This is usually NAHVNOY LED (Jammed ice) caused by the jamming of one ice layer onto another.
- GESTOTA L'DA - (Density [In distribution] of ice) - the percentage of water surface covered by ice. It is reported on a 10 ball system, where each ball corresponds to one tenth of the visible water surface, thus for example 2 ball density would imply that 2 tenths of the sea was covered by ice.
- REDKIY LED - (Very open ice) - from 1 to 3 balls. When ice density is less than 1 ball it is said that NABLYUDAYUTSYA OTDEL'NIYYE L'DY ("Separate pieces of ice are observed") in the sea. PLAVUN is the nautical term applied to separate pieces of ice which are easily by-passed. This type of ice is dangerous to shipping only in storms or heavy seas.
- RAZREZHENNY LED - (Open ice) - often wind will drive broken ice into thin bands stretching over open water. Such bands are known as POYASINA. The term LED NA RASPLAVAKH is used to describe the phenomenon when less than 5 balls of ice is distributed evenly over the visible sea surface.
- SPLOCHENNY LED - (Close ice) - this describes a condition when there are 8 to 9 balls of ice on the visible sea surface. Often in close ice one finds PEREMICHKI or STICHINY, which are points of junction, formed when two ice fields collide with one another.
- SPLOSHNOY LED - Compact ice.
- KOLOB - that part of the sea which lies directly adjacent to the shore, where the ice remains whole, and does not appear to be breaking up.

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OSTROGA - that part of the sea which is some distance off-shore, but where the ice remains whole and does not appear to be breaking up.

PAYDA - a coastal band of ice, whose drift has been slowed up considerably as a result of entanglement with the shore irregularities, or with ice grounded on inshore bars. In a PAYDA it is said of ice ~~that it~~ it moves at various speeds resulting from collision with other particles of ice, or from various current speeds.

S'EM - is that area of water between fields which is filled with broken ice. S'EMY are used by ships as lanes through which it is possible to navigate in areas where ice fields are present.

SZHATIYE L'DA - (Jammed ice) - jamming of ice due to the influence of wind or current, acting in a direction opposed to that of the possible free drift of the ice.

ZHOMY - Nautical term for SZHATIYE L'DA.

RAZREZHENIYE or RAZRYADKA L'DA - (Thinning or spacing of ice) - describes the thinning of the amount of ice on the sea surface, as well as a decrease of its area due to thaw or break-up.

RAZVOD'YE - Thinning of the ice up to the point where areas of open water appear in it. The appearance of RAZVOD'YE in the open sea is often related to tides (tidal lead). In such cases thinning of the ice alternates with jamming (SZHATIYE), and begins at a fixed time, dependent on the culmination of the moon. LEDYANY CHAS (Ice hour) is the average interval of time ~~between the upper culmination of the moon and the next~~ after the RAZVOD'YE in a given location. RAZDEL is the term applied to those parts of the sea where one observes RAZVOD'YA which were formed by current, independent of the direction and speed of the wind.

RASSCHELINA (Lead) or KANAL (Canal) - clear water lanes in close ice, caused by the effect of current or wind. These are used by ships for purposes of navigation.

POLYN'YA - separate closed, areas of clear water in an ice covered region. In a drifting ice cover POLYN'I appear between fields. The phenomenon known as the VELIKAYA SIBIRSKAYA POLYN'YA (Great Siberian polynya) is found in the East-Siberian sea during the winter season.

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LEDYANOY OTBLESK - (Ice reflection) or LEDYANOYE NEBO - (Ice sky) - characteristic whitish hue given to the lower layers of clouds hanging over accumulations of ice. On the other hand VODYANOYE NEBO (Water sky) is the term given to the characteristic blueish hue over open water areas.

OTKRYTAYA or CHISTAYA VODA - (Open or clear water) - are large spaces of open or clear water, bordering ice covered surfaces. Often an off-shore wind will open up a fairly open or clear water lane along the shore. This lane is known as RYNCHARA or RYNCHAG. Such lanes are used for sailing the Great Northern Sea Route. At sea ZHIVA ("Alive") or VOL'NA ("Free") are terms used to describe clear or open water amidst ice.

LED POLPOCHIT - ("The ice is crowding") or MAR' or MAREVO - (Mirage) - nautical terms applying to a visual displacement of ice on the horizon due to deflection of light rays.

KROMEA or GRANITSA L'DA - (Ice edge) - the ice edge is usually characterized by VAZYKY L'DA (Ice tongues).

ZAMERZANIYE MORYA - Freezing of the sea.

V SKRYTIYE MORYA - Clearing of the sea.

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Chapter XI. Populated Points and Administrative Division of the Coast

The following administrative regions divide the Arctic coast of the U.S.S.R.

MURMANSK OBLAST - Region center at MURMANSK. Divided into three administrative rayons: 1- the POLYARNYY with its center at URA-GUBA; 2- the TERIBERSKIY with its center at TERIBERKA; and 3- the SAANSKIY with its center at IOKAN'GA. The inhabitants of this OBLAST are mainly Russians and SAAMI. In September 1944 PETSAMO OBLAST (PECHENGA) was returned to the Soviet Union as a result of heroic victory of the Red Army.

NENETSKIY NATSIONAL'NIY OKRUG - (Nenets National Okrug) - in ARKHANGEL'SK OBLAST has its center at MAR'YAN-MARE. The coast of this Okrug takes in the Barents Sea and stretches east to the mouth of the KARA River. It is divided into three administrative rayons: 1- KANINO-TIMANSKIY with its center at NIZHNYAYA PESHA; 2- NIZHNE-PECHORSKIY with its center at OKSINO; and 3- BOL'SHEZEMEL'SKIY with its center at KHOSEDA-KHARD. Administratively the islands Vaygach, Novaya Zemlya, Kolguyev and Zemlya Frantsa Iosifa belong to Arkhangel'sk Oblast.

YAMALO-NENETSKIY NATSIONAL'NIY OKRUG - (Yamal-Nenets National Okrug) - in OMSK Oblast has its center at SALEKHARD. This includes the coast from the mouth of the KARA River to GYDANSKIY ZALIV. Here also there are three administrative rayons: 1- PRIURAL'SKIY with its center at SHCHUCH'YE; 2- YAMAL'SKIY with its center at YAR-SALE; and 3- TAZOVSKIY with its center at KHAL'MER-SEDE.

TAYMERSKIY NATSIONAL'NIY OKRUG - (Taymyr National Okrug) - is in KRASNOYARSKIY Krai, with its center at DUDINKA. It includes the coast from GYDANSKIY Zaliv to KHATANGA Zaliv. Here also there are three administrative rayons: 1- UST'-YENISEYSKIY with its center at KARAU; 2- AVAMSKIY with its center at VOLOCHANKA; and 3- KHATANGSKIY with its center at KHATANGA.

YAKUTSKAYA AVTONOMNAYA SOVETSKAYA SOTSIALISTICHESKAYA RESPUBLIKA - (Yakutsk ASSR) - has its center at YAKUTSK. It includes the coast from the KHATANGA River to the KOLYMA River. This region is divided into five administrative rayons: 1- ANABARSKIY with its center at SASKYLAKH; 2-

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BULUNSKIY with its center at KYUSIUR; 3- UST'-YANSKIY with its center at KAZACH'YE; 4- ALLAYKHOVSKIY with its center at ALLAYKE; and 5- NIZHNEKOLYMSKIY with its center at NIZHNEKOLYMSK.

CHUKOTSKIY NATSIONAL'NIY OKRUG - (Chukotsk National Okrug) - is in KHARAROVSK Kray and has its center at ANADYR'. It takes in the coasts of the East Siberian and Chukotsk Seas. Here there are three administrative rayons: 1- VOSTOCHNAYA TUNDRA with its center at OSTROVNOYE; 2- CHAUNSKIY with its center at PEVEKA; and 3- CHUKOTSKIY with its center at HELEN.

NASELENNIYE PUNKTY - (Populated points). - Refers to temporary settlements, airplane bases, fishing camps, and hydro-meteorological radio stations. KOLGUYEV, VAYGACH, NOVAYA ZEMLYA, NOVO-SIBIRSKIYE and VRANGEL' Islands all have inhabitants. STANA is the term applied to small settlements of trade or commercial origin found on NOVOSIBIRSKIYE Islands. On VRANGEL' Island there is a radio station in RODZHERS Bay on the southern coast of the island.

POLYARNIYE STANTSII - (Polar stations) - Usually radio-telephone and scientific stations, which service the Northern Sea Route, as well as provide meteorological data for the continent.

VREMENNIYE ZHILIYE PUNKTY - Temporary inhabited points. Seen all over the Arctic Coast. The following are examples.

PROMYSLIYIYE IZBY - (Industrial huts) - Found over the whole of the Arctic coast. Usually one room wooden cabins, heated by an iron stove or fireplace. Have a shed adjoining, where it's possible to store equipment and products. On the shores of the LAPTEV Sea and in the NOVO SIBIRSKIYE Islands such huts are known as POVARNYA.

RYBOLOVNIYE ZAVEDENIYA - (Fishing establishment) - Industrial huts used by fishermen. These are usually unoccupied during the winter season. The term RYBOLOVNIYE ZAVEDENIYA is used around the lower reaches of the Ob' River, as well as in the Ob' and TAZOV Gulfs.

STOYBISHCHE - (Chukchi settlement) - consisting of temporary buildings or YARANG'S.

STANOVISHCHE - (Industrial settlement) - term used mainly on the White Sea and on Novaya Zemlya.

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ZIMOV'YE - structure for a dwelling, inhabited or uninhabited, found on Arctic shores. The term ZIMOV'YE is used primarily in the KARA Sea.

URASA - YAKUTSK industrial hut for temporary habitation. It has a frame of poles, twigs or driftwood, and is covered by earth and soil. Heating is accomplished by a fireplace. Seen most frequently on the southern shores of the LAPTEV Sea and the NOVOSIBIRSKIY OSTROVA.

YURTA - YAKUTSK living quarters, having a flat roof and inclined walls. It also is built of wood and earth. Contains windows and heating facilities. Observed on the coast of the LAPTEV and East-Siberian Seas.

TORDOKH - cone shaped huts having pole frames. These are found on the southern coast of the LAPTEV and East-Siberian Sea.

CHUM - cone shaped huts inhabited by the nomadic Mentsy, Entsy and Iganassany. Pole frame. During summer this frame work is covered with one layer of hides, during winter it is covered with two layers of elk hides. A hole at the apex of the frames provides a means of escape for smoke. These are found on the coast of the BARENTS and KARA Seas.

YARANGA - Living quarters for Chukchi and Eskimos. Round and flat sided structure covered with hides of elk and marine animals. Inside of this is a smaller tent which serves as the actual living quarters. These are seen most frequently on the shores of the East-Siberian, Chukotsk, and Bering Sea, as well as on URANGEL' Island.

QOLOMO - local term used on the KARA Sea coast and the regions around the PYASINSKIY Gulf for industrial huts.

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