



Ice atlas of the parameters valid for sustainable development and marine animals' welfare:

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Investigations of ice cover parameters and ice regime features of the sub-Arctic marginal seas and inland water bodies have a protracted history. But unfortunately all arranged data has a significant defect. All available ice archives are described only the ice parameters that are related with ice navigation. The limited number of the parameters is indicated roughly at the composite ice maps: fast ice, drift ice; ice concentration (only 4 gradations), new ice, level ice; ridged and rafted ice; ice edge; leads and cracks. Systematization of these data that was performed as different regional manuals and climatological atlases only aggravated the situation: temporal and spatial generalization of ice parameters hampers hydro-biological and ecological studies of behavior of ice form of marine animals. We have a long-term experience of airborne and satellite SAR studies of the marine environment as habitat of aquatic species. Our comprehensive multi-spectral multi-level investigations of ice and different representatives of ice form of marine animals (harp seals, grey seals, ringed seals, walrus as well white whales) in proper Arctic and inland water bodies (Ladoga Lake, White Sea, Baltic Sea and Caspian Sea) were started at the second half of 1990-s. Our remote studies were aimed on the revealing of biologically and ecologically significant processes and phenomena, on study ice as abiotic factor of ecology of ice-associated mammals, on charting of water and ice pollution, on control of dissolved organic matter and sediments, on control of seasonal blooming and blue-green algae arrangement, as well investigations of winter hydrology and ice dynamic regarding to behavior ecology of ice form of marine mammals (ice drift and up-welling, eddies and mushroom structures, internal waves and seiches, Langmuir circulation, etc.) For the thematic interpretation of ERS/RADARSAT/Envisat SAR satellite data and retrieving of biological and geophysical parameters we are using the results of traditional in situ ice

observations that were fulfilled in frame of field experimental studies. The main objective of presented studies is preparing the Ice Atlas of the Baltic Sea and the Ladoga Lake suitable for biological usage. It will describe the regional features of ice parameters valid for sustainable development and marine animals' welfare. This Atlas will content satellite SAR images and airborne and in situ data as well the legend with annotation of specific ice phenomena most attractive (and in contrast unacceptable) for different representatives of ice form of seals. The problems of climate change as well anthropogenic press will be discussed.