Introduction

Ice observations are the basis of ice cover condition studies and can be divided into visual and instrumental. Regular visual observations of sea ice started in the beginning of XX century, at first during ship expeditions, then during organization of stationary meteorological stations and implementation of ice reconnaissance flights.

From the middle of 30-s and till the end of 80-s airborne ice reconnaissance was one of the most essential means for obtaining information about ice conditions in the Arctic and freezing seas. Apart from that, regular ice observations in open sea were made by oceanographic expeditions “Ice patrol”, which regularly operated in all Arctic Seas. Methodic of visual ice observations was steadily improved and till the beginning of 90-s principal ice information was obtained from ice reconnaissance airplanes.

In 1961 training courses were organized at Arctic and Antarctic Research Institute (AARI) to train young specialists, especially ice observers, conducting airborne ice reconnaissance. AARI was a guidance centre in Russia, because specialists from Regional departments of hydro meteorological service took these courses.

When regular airborne reconnaissance stopped its work in 1991, images, received from Earth Observation satellites, became the most important source of sea ice information. Ice observers were obliged to re-train into specialists of satellite images interpretation.

Thus, the courses for ice observers stopped its training work due to end of regular ice reconnaissance and sharp economical changes in Russia in the 90-s. Nevertheless, increasing marine activity in the Arctic shelf and freezing seas (construction of new terminals, ice-resistant stationary platforms and increasing of navigation intensity) in the beginning of XXI century raise new requirements to quality and content of ice information. Regular ice observations are necessary in regions, where terminals and platforms are located, to provide safe navigation operations. High-quality ice observations are necessary along ship routes to work out recommendations of optimal sailing routes of container vessels, tankers and service vessels.

In accordance to this, question about renewal of courses for ice observers became really essential. In 2007 the program, directed to organization and providing of ice observers training, was developed. The following work was done within this program:

- development of a "ice expert – ice observer” training course concept;
- development of educational programs for speciality “ice expert – ice observer”;
- development of educational methodic plans for specialty “ice expert – ice observer”;
- development and preparation of science-methodic materials;
- accounting of standard- legal documents for organization of educational course;

- training of first experimental group of “ice expert – ice observer”.

Course concept is based on subject-orientated approach to studies, directed to formation of professional skills in in a degree, which allows ice experts working out recommendations, used as a basis for decision-making during conducting marine operation.

The methodic basis of the course is description of the subject through understanding of knowledge about regularities (physical processes) of ice cover formation, manifestation of its properties and their observation as phenomena (specific ice conditions).

During the course students must obtain theoretical and methodic knowledge about ice observations and sea ice mapping, and also practical skills in IT-technologies, used for ensuring activity in freezing seas.

Analysis of the first stage work results showed, that development and creation of appropriate training manual are also necessary for preparation of full set of methodic materials, and supplying courses of raising qualification level or specialists retrain. Training manual must present a document for self-preparing to studies and self-education. It must consist of summaries of brief theoretical and practical questions for self-preparing.

Main tasks of manual are the following:

- acquaintance with the history of instruments and methods of ice observations development;

- systematization of audience knowledge on formation of integrated idea of ice cover formation;

- studying sea ice types and peculiar features of its formation, depending on hydrological and meteorological conditions;

- studying ice regime regularities in the Arctic and freezing seas;

- studying international sea ice nomenclature, international and national sea ice symbolics;

- studying and understanding methods and ways of sea ice observations in the Arctic and freezing seas (aircraft – airplanes and helicopters, ship – visual and instrumental observations), and also by means of remote sensing data.

Training manual is orientated to integrate skills and knowledge, obtained by students during learning basic university disciplines by specialties, included in concept of “hydrometeorology”. It is the basis of post-graduated education and advanced professional training of specialists in new fields of hydrometeorology and related disciplines, being regulated by the following normative documents:

- Federal law from 22 of August, 1996, № 125-ФЗ "About high and post-graduated professional education" (Collected legislation of Russia Federation, 1996, № 35, p. 4135);

- Rules of development, confirmation and consummation of state educational standards of primary, secondary, secondary professional, high professional and post-graduated professional education (appr. By Government regulation of RF from 21 of January, 2005, № 36);

- Government State Standard of high professional education, direction 510900 – Hydrometeorology Degree – Magister of Hydrometeorology (approved by vice-Minister of Education of RF on 10 of March, 2000. Number of government registration 112 ЕН / маг);

- Government State Standard of high professional education. Government requirements to minimum content and education level of graduating student by specialty 012800 – OCEANOLOGY (Approved by vice-chairman of State Universities Commission of Russia on 7 of June, 1994).