Determination of ice concentration from SSM/I data

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At present there are about ten different algorithms of SSM/I data processing for generation of sea ice concentration charts. Due to various reasons, for instance: specific laws of radiation - physical substance interaction, the task of satellite data interpretation and generation of ice concentration charts is not successfully resolved yet. Ice concentration, evaluated on the basis of passive microwave data is sensitive to mixed calibration, change of sensor properties, assignment of land-ocean boundaries. Conventional algorithms of sea ice parameters determination on the basis of SSM/I data take into account empirical relationships and tuning coefficients, but sometimes on the cost of loosing physical background of processes. We present the model of interaction of radiation with sliced strata. Initial parameters of the model are actual properties of ice and snow. This allows using this model for interpretation of remote sensing data on sea ice. New algorithm of ice concentration determination from SSM/I data is introduced. The algorithm is built on the basis of electrodynamic model of radiation properties of ice and snow cover. The model takes into account actual physical parameters of ice and snow and does not use any empirical and tuning coefficients. We present comparison of evaluated concentration of Arctic sea ice on the basis of developed algorithm with direct visual measurements from icebreakers and with results of other models. Developed algorithm is free of drawbacks, which exist in conventional methods. It allows making high quality determination of the state of the Arctic sea ice cover.