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Organization and mechanics of ice cover destruction on the basis of satellite image investigation of the Arctic Ocean

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Objective of present investigation is dynamics and mechanics of the Arctic Ocean ice cover in order to solve the problem of forecasting ice state in local and global scales. Analysis of ice cover satellite images, drifting buoys data and contact measurements of ice deformation carried out with the help of the "North Pole" drifting stations NP-32 and NP-33 are carried out. Physical -mechanical processes of ice pressing and hummocking, formation of extended channels and separations, origination of self-similar structure are considered as a result of interaction within the ocean-atmospheric system. The different methods of ice cover fractal dimension estimation are used. It is shown that the value of fractal dimensions is sensitive to type of shear deformations in ice cover. One of the factors creating this deformation process is dynamical shearing of ice, surface and internal waves producing the ice cover fragmentation. The energetic spectrum of cyclic interaction in ice cover is revealed. The obtained results can be used for development of dynamics loading of hydraulic structure estimation.

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