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# Interannual changes in sea ice conditions on the Northern Sea Routes obtained by satellite microwave sensors

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This study sets seven sea areas and three temporal segmentations for the analysis of NSR and examined sea ice area by sea area using data obtained from SMMR, SSM/I and AMSR-E. In analyze using SMMR and SSM/I, the results indicated the sea ice was in the decreasing tendency from first phase to third phase. Recently sea ice area decreased in third phase compared with in first phase and second phase as an example in southwestern Chukchi Sea and western East Siberian Sea. And, we research region that sea ice conditions was severe in first phase like western Laptev Sea, northeastern Kara Sea and eastern East Siberian Sea. In third phase, western Laptev Sea and northeastern Kara Sea is still severe region for navigation. On the contrary, in eastern East Siberian Sea, sea ice area was a decreased greatly in third phase comparison with first phase and second phase. Furthermore, we analyzed sea ice area using AMSR-E data because we analyzed by high resolution data. Most sea ice disappears during summer in the sea near doorway of Arctic Ocean such as southwestern Chukchi Sea and southwestern Kara Sea. Sea ice area in western Laptev Sea was severe region as well as analysis using SMMR and SSM/I. Also decrease of sea ice in western Laptev Sea was hardly seen during 2007 that sea ice decreases remarkably. In analysis of standard deviation, western Laptev Sea indicated high values. Therefore around western Laptev Sea is key area for navigation such as prediction of sea ice condition or sailing plan of ship.

Keywords: Sea ice, Arctic Ocean, Northern Sea Route