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Change of the relationship between the sea ice of Barents-Kara sea and Beaufort-Chukchi sea

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Arctic sea ice extent has a continuous decreasing trend in all months, especially in September according to the satellite record (1979-present). Also, this decreasing trend has accelerated (Stroeve et al., 2012). In this study, the motivation is about how do sea ice variabilities change in the decreasing trend. Separating two periods that have different trends, the Empirical Orthogonal Function (EOF) analysis was applied to the sea ice anomalies from each period. The EOF patterns of two regions, the Barents-Kara sea and Beaufort-Chukchi sea, showed clear change from opposite pattern to same pattern in accelerating decreasing trend. And this change can be identified more significantly from the correlation between boreal summer Beaufort-Chukchi sea ice and autumn Barents-Kara sea ice (Negative correlation -> Positive correlation). The main driver of the positive correlation between two regions was an autumn Rossby wave pattern along the Eurasia, negative Scandinavian Pattern, that is associated with summer Beaufort-Chukchi sea ice reduction. The sea ice nudging experiment using the NUIST Earth System Model (NESM) version 3 also showed that the positive correlation and autumn Rossby wave pattern, compared to the control simulation. Thus, there is a clear change of the relationship between summer Beaufort-Chukchi sea ice and autumn Barents-Kara sea ice and it is associated with autumn Rossby wave pattern.