（学位第３号様式）

学 位 論 文 要 旨

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題　目	Interannual to interdecadal variability of the Kuroshio in the East China Sea (東シナ海の黒潮における経年・十年規模変動)

The Kuroshio, which serves as the western boundary current of the North Pacific subtropical gyre, is one of the most important elements that control the oceanic and atmospheric conditions of East Asia. However, mechanism for the temporal variability of the Kuroshio still maintains unknown. In this doctoral thesis, we firstly study the decadal variability of the Kuroshio in Chapter 1, and investigated its interannual variability in Chapter 2.

On decadal timescale, it has not yet been established whether the Kuroshio responds with uniform spatial and temporal patterns throughout or whether different subsystems respond differently. Hence, in Chapter 1, we will investigate the synchronized features of decadal variabilities in current intensity and current position over the Kuroshio System. Hovmöller diagrams, showing the temporal and spatial variability for the Kuroshio System, indicated that the Kuroshio comprised three subsystems characterized by coherent phase relations: namely, 1) Kuroshio in south of Japan and Kuroshio Extension (KE), 2) Kuroshio from east of Taiwan (ETW) to East China Sea (ECS), 3) Kuroshio from east of Luzon Island to Luzon Strait. More importantly, we found an out-of-phase relationship in current intensity between the Kuroshio from ETW to ECS and the KE during 2006–2014, which governed almost the entire Kuroshio System. This synchronization was caused by coherent phenomena comprising two kinds of baroclinic Rossby wave propagations along the KE and the subtropical countercurrent (STCC), which was related to Pacific Decadal Oscillation.

On interannual timescale, previous studies had shown that interannually modulated East Asian summer precipitation was caused by an atmospheric response to the El Niño–Southern Oscillation (ENSO). However, it is still uncertain whether the western boundary of the North Pacific region dynamically responded to the ENSO; therefore, in Chapter 2, we aim to address this problem in terms of the relation of the interannual ECS-Kuroshio variability to the ENSO. We found that the surface velocity and position of the ECS-Kuroshio were synchronized on a quasi-3-year interannual timescale during 2005–2016. We further determined that, during 2005–2016, baroclinic Rossby waves along the STCC zone east of Taiwan, which were excited by wind forcings related to the ENSO, played a leading role in the interannual ECS-Kuroshio variability, and mesoscale eddy activities in the STCC zone probably played a secondary role. Moreover, we suggested that, since the mid-2000s, the change of the primary ENSO timescale and the amplification of the sea surface temperature variability in the tropical ocean have led to the occurrence of the quasi-3-year interannual variability of the ECS-Kuroshio through the western North Pacific atmospheric response to the ENSO.