レジームシフトの指標としてのウトウ

山本　真理子[1]、綿貫　豊[1]
[1] *北海道大学水産科学院*

Rhinoceros auklet's as indicator of regime shift

Mariko Yamamoto[1], Yutaka Watanuki[1]
[1]*Graduate School of fisheries Sciences, Hokkaido University*

Populations of small pelagic fish species such as anchovy and sardine, that are important as food for marine top predators and also as target species of fisheries, fluctuate quickly because of the change of mesoscale-decadal climate change (regime shift). The cold to warm regime shift occurred in the Tshushima current region in Japanese Sea in 1987 when the dominant pelagic species shifted from cold water-living Japanese sardine *Sardinops melanostictus* to warm water –living Japanese anchovy *Engraulis japonicus* . After 2010s, however, abundance of Japanese sardine is suspected to increase, while that of Japanese anchovy is decreasing; suggesting regime shift from warm to cold might occur but no evidence has been obtained.

Effects of climate regime shift may vary among trophic level. Typically, abundance of pelagic fish fluctuates greatly than seawater temperature and that of zoo plankton. Rhinoceros auklet *Cerorhinca monocerata*（RHAU）breeding on Teuri Island northern Hokkaido Japan Sea side, feed mainly on pelagic fish. In 1987 when regime was shifted from cool to warm phase, RHAU switched prey from Japanese sardine/Japanese sand lance *Ammodytes japonicus* to Japanese anchovy. We examined the changes on food and breeding success of RHAU to the suspected recent warm to cold regime shift and discuss if RHAU can be indicator of regime shift.

RHAU brought Japanese anchovy (65-95 % in mass) to their chicks in 2006-2013 but Japanese sand lance, arabesque greenling *Pleurogrammus azonus* and squid sp. after 2014. Average bill-load mass in 2014-2017 (16-21 g) was smaller than that of 2004-2013 (26-36 g). Fledging success was 32-73 % in 2006-2013 but 0-24 % in 2014-2017. As mass of single fish and energy density of Japanese anchovy was larger than another fish species, this failure of breeding after 2014 attributed to the disappearance of anchovy in the water around Teuri Island. RHAU apparently shifted prey from anchovy to alternative prey in 2014 but the decrease of the size of Tushima stock of Japanese anchovy was not apparent and the shift of sea surface temperature in Japanese sea was not observed around 2014. Therefor potential regime shift that could not be appeared at stock size of Japanese anchovy and sea surface temperature might be observed in the RHAU. Underlying mechanism was not clear but the change of water current and/or the change of migration behavior of Japanese anchovy might explain. Thus our study gives a new insight on the mechanism how regime shift affect top predator.