

# Habitat suitability model of *Uroteuthis edulis* using remote sensing data and GIS in the South East China Sea

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## Abstract

Squid (*Uroteuthis edulis*) was one of the important commercial species of the Taiwanese Torch-lighted fishery in the northern waters, Taiwan. The modeled oceanographic data of sea surface temperature (SST), sea surface height (SSH), sea surface salinity (SSS), mix layer depth (MLD), current intensity (current), and satellite-based oceanographic data sea surface chlorophyll-a (SSC) with catch data collecting from Taiwanese Torch-lighted fisheries were simultaneously collected during 2015-2017. The Generalized Additive Models (GAMs) and maximum entropy models (MaxEnt) was used to evaluate the effects of oceanographic conditions on the formation of potential fishing zones for Squid and then to explore the spatial variability of these features in the northern waters, Taiwan. The results from the habitat suitability index Model revealed its potential for predicting the spatial distribution of squid and highlighted the use of multispectral satellite images for describing potential fishing zones. The optimal range of hydrological variables in SST, SSC, SSS, SSH, MLD, and CUR, respectively, for the habitat of Squid were 26-28°C, 0.09-1 mg m<sup>-3</sup>, 34.4-35.8 psu, 0.5-0.7 m, 10-20 m, and 0.2-0.4 m/s. The spatial potential fishing zone patterns were explained predominantly by SSC is the most influential factor of geographic distribution in boreal dominant season (May to October). The geographic information system maps of fishing period of the predicted HSI values were overlapped by the observed CPUE in 2018, suggesting that the model can be used as a tool for reliable prediction of potential fishing grounds with the development of management regulations.

**Keywords:** Squid, Habitat suitability index, sea surface temperature, ECS