BIO-ORACLE: A GLOBAL ENVIRONMENTAL DATASET FOR MARINE SPECIES DISTRIBUTION MODELING

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The oceans harbor a great diversity of organisms whose distribution and ecological preferences are often poorly understood. Species distribution modeling (SDM) could improve such knowledge and inform marine ecosystem management and conservation. Although marine environmental data are available from various sources, there are currently no user-friendly, high-resolution, global datasets designed for SDM applications.

We present Bio-ORACLE (Ocean Rasters for Analysis of CLimate and Environment), a global dataset consisting of 23 geophysical, biotic and climate rasters. This dataset was compiled using global coverage data, e.g. satellite based and *in situ* measured data, representing various aspects of the marine environment relevant for species distributions. The rasters were assembled at a resolution of 5 arcminutes (ca. 9.2 km) and a uniform landmask was applied.

The utility of Bio-ORACLE was evaluated by maximum entropy SDM of the notorious invasive seaweed *Codium fragile* subsp. *fragile*. This allowed us to predict the distribution of the species, to assess the predictive power of the distribution model and to illustrate the potential of the data package for SDM of shallow-water marine organisms in general.

The high predictive success of the presence-only model of *Codium fragile* subsp. *fragile* shows that the information contained in Bio-ORACLE can be informative about marine distributions and permits building highly accurate species distribution models. In conclusion, we recall that the availability of this global environmental data package has the potential to stimulate marine SDM.