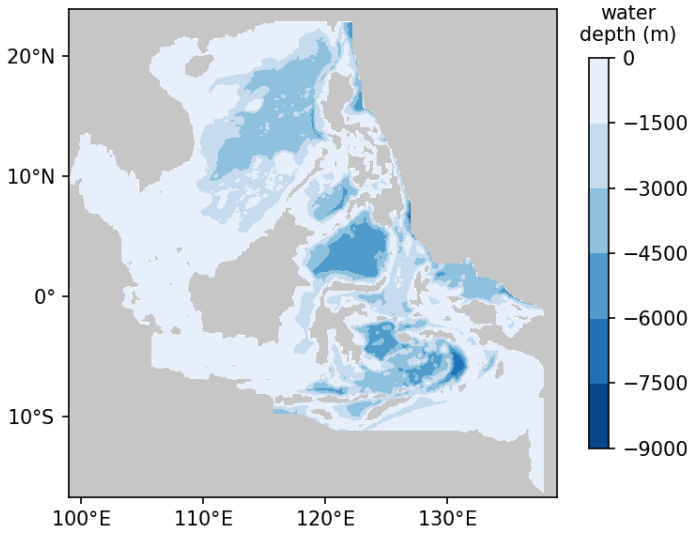
Dataset description: marine environment climate change projections for Southeast Asia

Projections of physical and biogeochemical conditions in Southeast Asian seas, 1980-2098, RCP4.5 and RCP8.5, derived from climate models.

Dataset created for the GCRF Blue Communities project www.blue-communities.org by Susan Kay, Plymouth Marine Laboratory, suka@pml.ac.uk.

Model used: v6.3 of the Proudman Oceanographic Laboratory Coastal Ocean Modelling System (POLCOMS, Holt and James 2001) coupled to v15.06 of the European Regional Seas Ecosystem Model (ERSEM, Butenschon et al. 2016).

Model domain: a region of the Global Coastal Ocean Modelling System (Holt et al., 2009). Horizontal resolution 0.1° x 0.1° (approximately 11 km); 40 vertical levels at each grid point, on a modified sigma distribution. Model cells near the open boundaries, which are strongly affected by boundary conditions, have been removed from this dataset. This figure shows the trimmed domain:



Forcing and boundary conditions: surface forcing from a regionally-downscaled CMIP5 model, HadGEM2-ES-RCA4; ocean boundary conditions from the global version of the same model, HadGEM2-ES (Jones et al. 2011); river inputs of fresh water and nutrients from the global model NEWS2 (Mayorga et al. 2010). River nutrient concentrations were not changed over time; discharge values were adjusted in line with applied precipitation.

Climate scenarios: for 2006 to 2098 the model was run for two Representative Concentration Pathways, RCP4.5 and RCP8.5. For 1980-2005 the model was driven by the historical run of the climate model.

Initial conditions: temperature, salinity, oxygen and nutrients from the World Ocean Atlas 2013 (Levitus et al., 2015); DIC and total alkalinity from GLODAP2.2016b

(Lauvset et al., 2016). The model was run for a 10-year spin-up time before the main run started at 1980.

Model variables included in the dataset: The original model was depth-resolved (40 levels) but only two-dimensional outputs are included in this dataset for space reasons. The available variables are:

	surface level	bottom level	column total	column average
temperature	x	x		x
salinity	x	x		x
eastward velocity	x			x
northward velocity	x			x
mixed layer depth	x			
water depth	x			
nitrate	x	x	x	
phosphate	x	x	x	
silicate	x	x	x	
oxygen	x	x	x	
pH	x	x		x
pCO2	x			
total alkalinity	x	x		x
dissolved inorganic carbon	x	x		x
aragonite saturation state	x	x		x
light attenuation	x	x		x
chlorophyll-a, total	x	x	x	
chlorophyll-a, by PFT*	x	x		
phytoplankton biomass, total			x	
phytoplankton biomass, by PFT*	x	x		
zooplankton biomass, total			x	
zooplankton biomass, by PFT*	x	x		
bacteria biomass	x	x	x	
dissolved organic carbon	x	x	x	
particulate organic carbon	x	x	x	
net primary production	x	x	x	
gross primary production	x	x	x	
secondary production	x	x	x	
community production	x	x	x	

Units are included in the file metadata.

* PFT = plankton function type. ERSEM has four phytoplankton functional types (diatoms, microphytoplankton, nanophytoplankton, picophytoplankton) and three zooplankton functional types (mesozooplankton, microzooplankton, heterotrophic nanoflagellates).

Note: the data for rcp45.2051.09 was corrupted. All values are masked.

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