

1. An overview of the UK's Earth System Model, UKESM1, and its marine biogeochemistry component, MEDUSA

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UK Earth System Model 1 (UKESM1) has been developed in a collaborative venture between NERC and the UK Met Office for the CMIP6 project that will feed into IPCC Assessment Report 6 (AR6). The marine biogeochemistry within UKESM1 is provided by the intermediate complexity model MEDUSA (Yool et al., 2013). Here we describe the components of UKESM1 with a particular focus on MEDUSA.

2. Spin-up preparations of MEDUSA and UKESM1 for CMIP6

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Prior to beginning formal CMIP6 simulations, participating Earth system models (ESMs) require a period of spin-up to equilibrate their component submodels. This is particularly true for marine physics and biogeochemistry because the timescales of ocean overturning are very long (> 1000 years), and this is underscored by a recent study of CMIP5 spin-up (Séférian et al., 2016). Here we describe the approach adopted for UKESM1 and its ocean component, NEMO-MEDUSA.