



Projections of storm surges over Sunda Shelf for the future climate

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Sunda Shelf is a southeast extension of the continental shelf of Southeast Asia. Large part of the Sunda Shelf geographically belongs to the South-China Sea (SCS). Our focus is on Gulf of Thailand and Eastern coast of Malay Peninsula, where sea level extremes up to 80 cm are predominantly generated by storm surges being driven by strong winds over SCS. According to Intergovernmental Panel on Climate Change Fourth Assessment Report (IPCC AR4) the future climate extremes are projected to increase on a back of mean sea level rise, that may lead to increase of sea level extremes in the domain. In this study, a spherical shallow water equation model is applied to estimate sea level extremes due to a combined effect of tides and storm surges over the Sunda Shelf. After calibration using observational data for the past periods 1961-1990 and 1981-2010, the model is applied for the 21st century projections using selected IPCC AR4 scenarios. The model is driven by the downscaled wind and pressure from three different general circulation models (CCSM, ECHAM and MIROC) under three different climate change scenarios (A1FI, A2 and A1B), totalling in 7 runs. Statistical parameters are computed individually for subsequent 30-year eras. It is found that for all considered models, scenarios and eras, the differences between 100 and 10-year return values are within the range 25-50cm. They are higher than the corresponding difference of 20-30cm in 1961-1990 period, which we interpret as higher variability of extreme sea levels in 21st century than in 1961-1990 years. Over majority of the region, results indicate small increasing trend of storm surge intensity during northeast monsoons at initial period and decreasing trend at the end of 21st century.