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Reliability estimates of decadal sea-level trend hindcasts

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Sea level future evolution is of primary importance in several sectors of our societies. For example, the work presented here is part of a French project aimed at evaluating impacts on coastal erosion in several French coastal regions, including overseas (see http://www.anr-cecile.fr/). Reliability of projections for the next decades (also called "near term" in the CMIP5 exercice) must therefore be evaluated carefully prior to evaluating such impacts. Our focus here is on the reliability of basin scale regional patterns of sea level projections, beyond the global lont-term trend over the last 50 years. The primary data used is the set of retrospective decadal hindcast ensembles produced in the framework of CMIP5 with the CNRM-CM5 model (Sanchez et al., 2011), initialised with ocean reanalyses obtained from ECMWF. One particularity of this data set, along with the accompanying 20th Century historical simulation ensemble including all forcings, is that they all have been performed with the same ocean model component. The problem arises with observational datasets for forecast verification. Here, most sources of sea level are used to assess hindcasts, either direct or indirect observations: accurate continuous quality controlled tide gauge records, several reconstructions based on these, ocean reanalyses of temperature and salinity, precise altimetry since 1992. In this poster, we show different estimates of reliability of decadal trend hindcasts, and the gain of initialised over uninitialized historical forced hindcasts. This is assessed with indirect observations, which are available continuously and globally, although they bear uncertainties in some regions. Using direct observations, we show that calibration using tide gauges improves hindcast reliability over the altimetry era. Finally, we investigate how such reliability diagrams can be used for projections up to three decades ahead.