# Regional variability of sea level change using a global ocean model developed at MERCATOR Ocean.

A. Lombard (1), G. Garric (2), and A. Cazenave (1)

(1) LEGOS-CNES, Observatoire Midi-Pyrénées, 31400 Toulouse, France, (2) MERCATOR-Océan, 8-10 rue Hermes, Parc Technologique du Canal, 31520 Ramonville St Agne, France.

Recent studies (Cabanes et al., 2001; Willis et al., 2004; Lombard et al., 2005; Lombard et al., 2006) have shown that the high regional variability of sea level change observed by satellite altimetry during the last decade is mainly due to thermal expansion as computed from different global ocean temperature data sets (Levitus et al., 2000, 2005; Ishii et al., 2003, 2006; Willis et al., 2004; Guinehut et al., 2004). However the causes of this regional variability are still ignored.

We try do understand the processes that cause regional variability of sea level change by analysing the outputs of the global ocean model $1/4°$ "eddy permitting" recently implemented by MERCATOR Ocean over 1993-2001. This model is based on the most recent NEMO (OPA9) code, and it is forced by the ERA-40 atmospheric forcing over the period 1993-2001. No observational data assimilation is performed in this model, in order to get independent analyses from in situ or satellite data.

We first check that the model reproduces correctly the regional distribution of sea level trends as observed by T/P over the same period (1993-2001) and same ocean domain (65S-65N). In addition we propose a regional distribution of sea level trends for high latitude oceans. We analyse the respective roles of temperature and salinity in the regional variability. We also examine the contribution of different vertical layers in regional distribution of steric sea level change. Finally we analyse the changes in heat fluxes, and different forcing parameters between 1993 and 2001, and their link with regional sea level change.