

#### **Contributions to Large Scale Sea Level Changes in the North Atlantic during the Last Decade**

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Regional sea level changes in the North Atlantic on spatial scales greater than 500 km are studied in the period 2002 to 2012. The focus is on the relation between the total sea level and its steric and mass related components. The data bases are: monthly gridded sea levels from the Jason-1/Jason-2 satellite altimeters processed by the GFZ's Altimeter Data System (ADS Central) as well as gridded steric sea levels from Argo floats (MetOffice) and mass related sea level from the GRACE mission (GFZ RL05 & CSR RL05).

For the observed period the total sea level has been rising in the Tropics and the Subtropics, which is almost balanced by a sea level drop along the Gulf-Stream Extension and in the north-eastern North Atlantic. The steric component of the upper 1000 m exhibits similar patterns but with a negative sea level trend for the whole North Atlantic. The mass component shows a weak positive sea level trend over most of the North Atlantic. The spatio-temporal patterns are studied using Empirical Orthogonal Functions (EOFs). For all three data sets the first EOF mode corresponds to the annual signal. For the anomaly series (annual signal subtracted) of the total and the steric sea level the dominant mode is connected to the North Atlantic Tripole and suggests a weakened height gradient between subtropical and subpolar gyre during 2010 and 2011. The principal component of this mode shows mainly inter-annual variability (~6 years). The second mode is common to all three data sets and seems to be connected to the subtropical gyre and the Gulf Stream.