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Tide gauge records at Dakar, Senegal (Africa): towards a consistent sea-level time series spanning more than 100 years?

G. Wöppelmann (1), B. Martín Míguez (2), R. Créach (3)

(1) UMR LIENSS, University of La Rochelle-CNRS, France (guy.woppelmann@univ-lr.fr)

(2) Intergovernmental Oceanographic Comission, UNESCO, Paris, France (b.martin-miguez@unesco.org)

(3) Service Hydrographique et Océanographique de la Marine (SHOM), Brest, France (ronan.creach@shom.fr)

An important issue concerned with the understanding of sea level variations due to climate change is the non-uniform geographical distribution of long-term sea level records. With a small number of exceptions, these records are located on the northern hemisphere, mainly in Europe, North America, and northern Asia. According to the PSMSL databank, there are only 6 stations in Africa with reliable datum continuity and record lengths over 40 years. In this context, the investigation that we have initiated at Dakar, Senegal, to find and rescue past sea-level records may prove worthwhile.

Several decades of sea level observations recorded at Dakar have been found so far, the earliest dating back to 1889. This poster provides an overview of the past and present sea level records at that location. Most of the historical records are in paper form (tidal charts and tabulations) and are not included in public databanks yet. The digitalization is under way, carried out by SHOM and University of La Rochelle to provide values in numerical form for further analyses. The quality of the recovered data is checked to assess the validity of the observations. Past and present data sets are analyzed for the first time in a comprehensive review. The objective is to build a consistent sea-level time series at Dakar spanning more than a century.

A key issue to achieve this objective is datum continuity. The origin of the height system in Senegal is located at Dakar, thus providing a natural benchmark for sea level, the fundamental benchmark of the levelling network. It is expectable that the different institutions involved in sea level observation at Dakar have chosen this same benchmark. A long-term linear trend can therefore be estimated from the recovered time series. This preliminary estimation yields a value of 1.4 mm/yr over the past hundred years.