



UNESCO



SEA LEVEL MEASUREMENT IN COTE D'IVOIRE

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Introduction

Côte d'Ivoire lies along the Gulf of Guinea on the west coast of Africa. Since 1960's, the Gulf of Guinea has been studied intensively especially by oceanographers. These extensive studies founded mainly on *in situ* measurements until 1980's have considerably increased the knowledge of general hydrology, circulation and seasonal variations in the Gulf of Guinea. A strong cold season (major upwelling) is observed from July to early October along the coasts of Ghana and Côte d'Ivoire.

During 1960's-1980's, most of the studies on sea level along the Gulf of Guinea were based on tide gauges records since they provide a valuable contribution to regional observing system of ocean and the climate. Unfortunately most of tide gauges have records spanning a few years while many of them are not operational because it is difficult to maintain them over several years. In the Gulf of Guinea, there is a lack of *in situ* measurements network: the tide gauge of Lome (Togo) was operated by French office IRD since 1993. Those of Lagos (Nigeria), Cotonou (Benin) and San Pedro (Côte d'Ivoire) are not really operational for sea level measurements. The one of San Pedro is an old fashion float tide gauge with continuous analogical records and contains multiyear gaps. The tide gauge operates at Abidjan is not appropriated for sea level measurement.

This report gives information on the tide gauges which have operated in Côte d'Ivoire, the quality of the data collected.

Abidjan station

The tide gauge is installed in Canal de Vridi (longitude 4°W, latitude: 5°15'N). There is an influence of the lagoon and this equipment is not appropriated to provide sea level measurements. In this station, there is no existing data available in computer form.

This station is maintained by the Port Autonome Abidjan. There is no tidal prediction for this station.

In ODINAFRICA-III programme, one tide gauge will be installed at Abidjan. This station is recommended by GLOSS and ODINAFRICA. However, it is necessary to change the location of the tide gauge. This new station should be equipped with satellite equipment for satellite transmission. This will provide a real time data network.



Location of the tide gauge (photo: Dje Daniel, Port Autonome Abidjan, 2004)

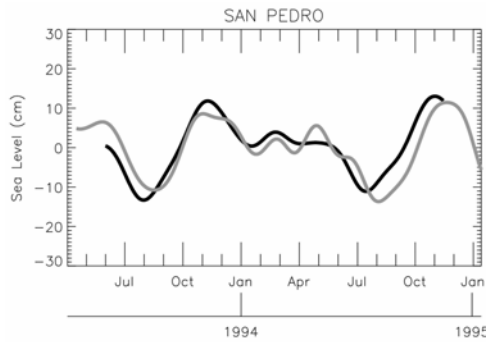


(Dje Daniel, Port Autonome Abidjan, 2004)

San Pedro station (longitude: 6,3 W; latitude: 4,73 N)

The tide gauge which operates in San Pedro port is an old fashion. It is maintained by the Port de San Pedro (web site: www.sanpedro-portci.com).

The data are available in hard copy. Data from 1991 to 1996 exists in computer form (LEGOS, Toulouse). Comparison was made with Topex/Poseidon (T/P) track n° 161 over June/1994 – September/1995 period. The comparison gives a correlation of 0.86 and an rms of 3.4 cm (see figure 1). This is the first time where a comparison is reported between tide gauge measurements and T/P signal. The tide gauge and altimetry data reproduce clearly the seasonal signal along the Ivorian coast. Two maxima and two minima are observed each year. This study shows that satellite altimeter can detect correctly the spatio-temporal variability of the sea level along the Côte d'Ivoire coastline. The result obtained here points out the necessity to upgrade and develop a tide gauge network along the coastline of the Guinea Gulf. Such opportunity is developed in ODINAFRICA-III project.



(Figure 1 ; Aman and Testut, 2003)

Conclusion and recommendations

Sea level poses a serious threat to vulnerable coastal cities and infrastructure, small islands and coastal environment in Africa. The rate of sea level rise along the coast of Africa is similar to global picture (1~2 mm/year) and this could attributed to warming global climate. In the Gulf of Guinea, there is no operational tide gauge for sea level measurements from San Pedro to Pointe Noire (Except Sao Tome). In Africa, the sea level continuous records are very short (less than 20 years). There is a great need of tide gauge measurements in the Gulf of Guinea because they constitute a fundamental value for coastal upwelling system in this region. The sea level measurements derived from tide gauge could also contribute significantly to calibrate altimetry data. There is a great need of training (technicians and researchers) in Côte d'Ivoire for tide gauge maintenance and data analysis.

Acknowledgment

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