



## Climate Change

# PREFACE

### At a glance

**Title:** Enhancing prediction of Tropical Atlantic climate and its impacts

**Instrument:** Collaborative project

**Total Cost:** 12 170 345€

**EC Contribution:** 8 999 433€

**Duration:** 48 months

**Start Date:** 01/11/2013

**Consortium:** 28 partners from 18 countries

**Project Coordinator:** University of Bergen (NO)

**Project Web Site:**  
<http://www.preface-project.eu>

### Key Words:

Climate processes, variability and change; Climate prediction; Climate models; Climate impacts; Ocean observations; Tropical Atlantic; Marine ecosystems; Fisheries; Africa; Vulnerability.

### The challenge

The Tropical Atlantic climate recently experienced shifts of great socio-economic importance. The oceanic changes were largest in the eastern boundary upwelling systems, globally important regions for marine productivity and climate. African countries bordering the Atlantic depend upon their ocean - societal development, fisheries, and tourism. They were strongly affected by these changes and will face important adaptation challenges associated with global warming.

Compounding this, the Tropical Atlantic is a region of key uncertainty in the earth-climate system: state-of-the-art climate models exhibit large systematic error, climate change projections are highly uncertain, and it is largely unknown how climate change will impact marine ecosystems.

### Project Objectives

PREFACE aims to address these interconnected issues, and has the following goals:

- To reduce uncertainties in our knowledge of the functioning of Tropical Atlantic climate.
- To improve climate prediction and the quantification of climate change impacts in the region.
- To improve understanding of the cumulative effects of the multiple stressors that are climate variability, greenhouse gas induced climate change, and fisheries, on marine ecosystems and their services.
- To assess the socio-economic vulnerabilities and evaluate the resilience of Atlantic African fishing communities to climate-driven ecosystem shifts and global markets.

## Methodology

To meet these objectives PREFACE goes beyond the state-of-the-art by bringing together European and African expertises in climate modelling and prediction, oceanography, and fisheries and its management. To close key knowledge gaps PREFACE enhances observations, analyses underutilised observations, and uses advanced ocean and climate modelling capabilities.

PREFACE work is split into four research areas:

- The role of ocean processes in climate variability;
- The evaluation of current climate models and bias reduction;
- Climate prediction in the Tropical Atlantic;
- The impacts of climate change on pelagic functional diversity in the Tropical Atlantic with effects on western African fisheries economies.

## Highlighted Results

In 3 years of life-time PREFACE has made great progress towards delivering the first comprehensive assessment of the Tropical Atlantic climate and its impacts (details available – or soon to be – on the project website):

- New oceanic observations were established in the Gulf of Guinea and the African Eastern Boundary Upwelling regions;
- The key oceanic processes driving oceanic variability in these regions were identified;
- Insufficient atmospheric model resolution was recognised as a key cause of the long-standing South-Eastern Atlantic coupled model errors;
- The impact of systematic errors on simulated Tropical Atlantic variability and its global consequences was clarified;
- Climate variability effects on the marine ecosystem have been better understood;
- A deeper appreciation of the socio-economic consequences of climate on small scale fisheries in West Africa has been achieved.

It is our tight EU-Africa collaboration that enables these exciting results to be obtained.

Project Partners	
Universitetet i Bergen (NO)	Centro Nacional de Supercomputación (ES)
Kobenhavns Universitet (DK)	Universidad Complutense de Madrid (ES)
Centre Européen de Recherche et de Formation Avancée en Calcul Scientifique (FR)	The University of Reading (UK)
Institut de Recherche pour le Développement (FR)	Instituto Nacional de InvestigaçãO Pesqueira (AO)
Météo-France (FR)	Ministry of Fisheries and Marine Resources (NA)
Université Pierre et Marie Curie (FR)	University of Cape Town (ZA)
Helmholtz Zentrum für Ozeanforschung Kiel (DE)	Instituto Nacional de Desenvolvimento das Pescas (CV)
Institut für Ostseeforschung Warnemünde an der Universität Rostock (DE)	Institut National de Recherche Halieutique (MA)
Johann Heinrich von Thünen-Institut, Bundesforschungsinstitut für Ländliche Räume, Wald und Fischerei (DE)	Institut Sénégalais de Recherches Agricoles (SN)
Christian-Albrechts-Universitaet Zu Kiel (DE)	Université Cheikh Anta Diop de Dakar (SN)
Università Cá Foscari Venezia (IT)	Université d'Abomey-Calavi (BJ)
Wageningen University (NL)	Centre de Recherches Océanologiques (CI)
Havforskningsinstituttet (NO)	University of Nigeria (NG)
Uni Research As (NO)	Université Libre de Bruxelles (BE)