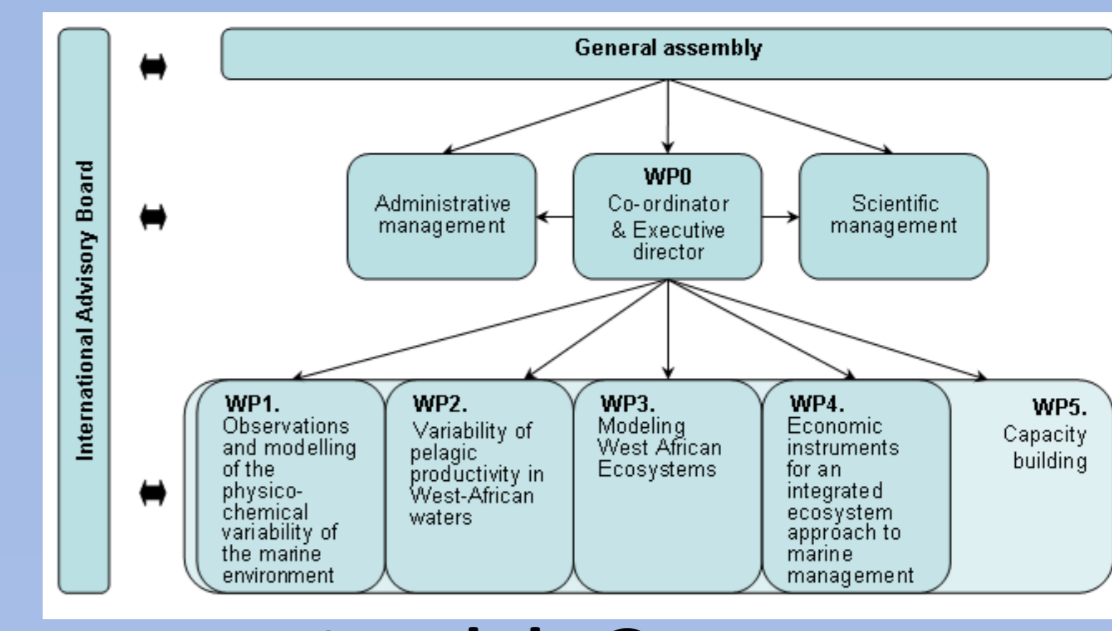


The AWA project: Ecosystem Approach to the management of fisheries and the marine environment in West African Waters



Trilateral German-French-African research initiatives in Sub-Sahara Africa. **Subject area: 'Environment'**

4th AMMA International Conference, 2-6 July 2012, Toulouse, France



Main objectives of the AWA Project

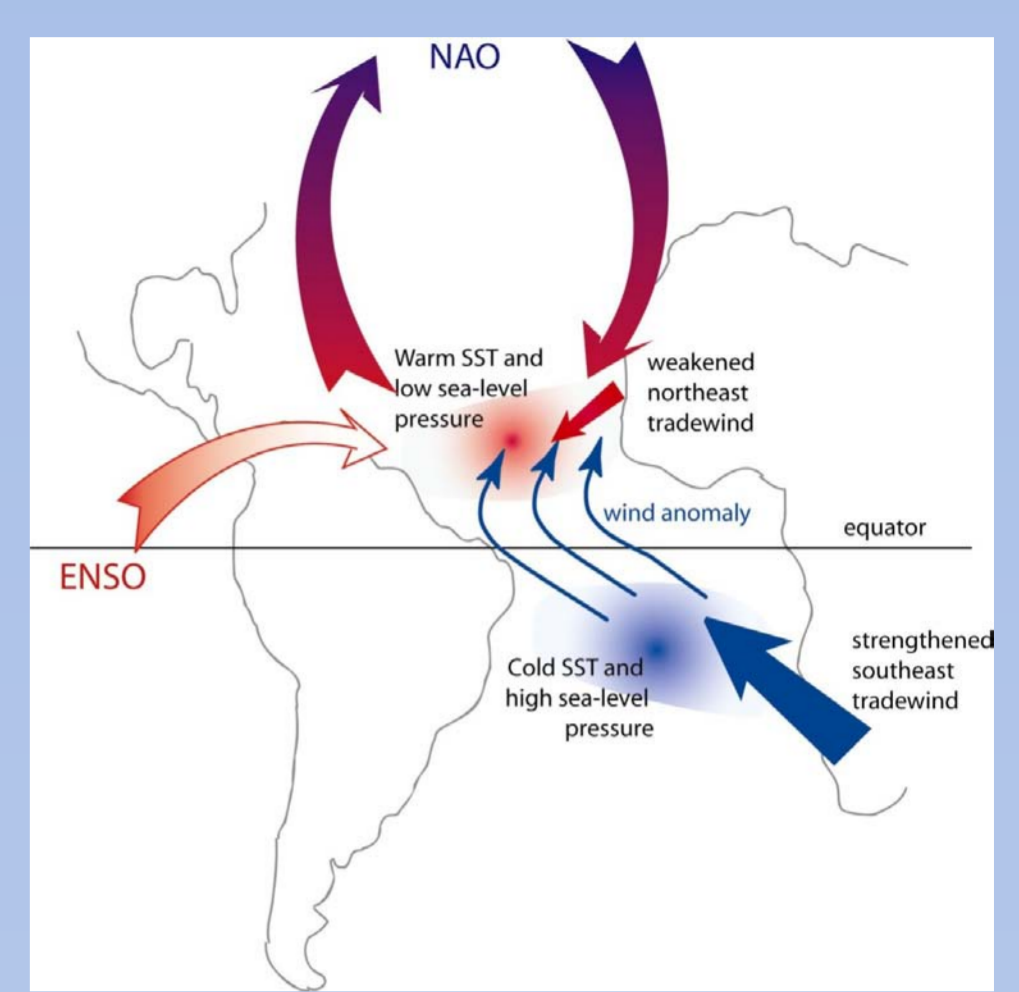
- What are challenges and threats to the West African marine environment?
- How does it evolve under human activities and ongoing climate change?
- How to improve knowledge, local expertise and capacity to manage the marine environment sustainably?

Addressing the main drivers: Tropical Atlantic Variability

Mechanisms influencing variability of tropical North Atlantic sea surface temperature:



- Meridional gradient mode;
- North Atlantic Oscillation;
- El Niño / Southern Oscillation.



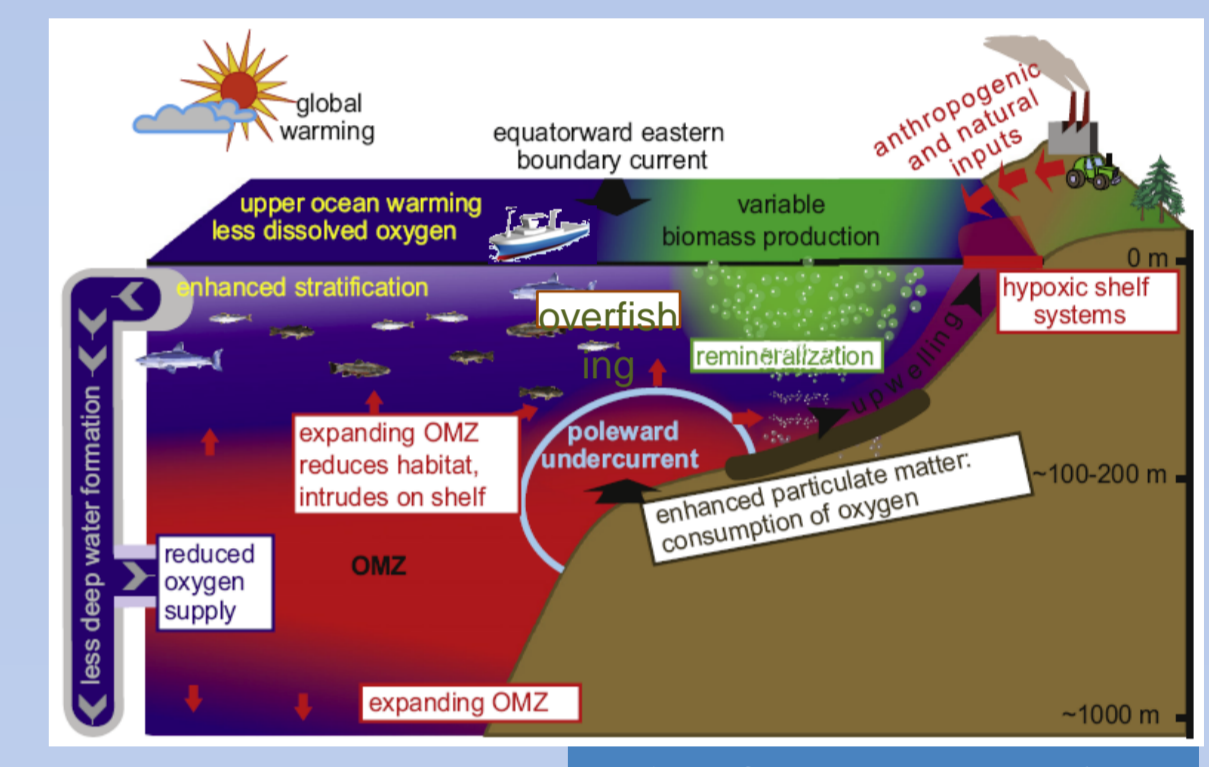
Chang et al. 2006

Addressing the main drivers: Climate change and human impact

- Global warming;
- Overfishing;
- Marine pollution; etc.

The AWA approach

- Collect, analyze and synthesize existing data series;
 - Improve existing monitoring activities and develop new data collection programs;
 - Conduct process studies;
 - Develop disciplinary and integrated modelling.
- to...
- Better understand scales and magnitude of variability throughout all layers of the system;
 - Enhance our predictive capacity of physical and ecosystem responses to different stressors;
 - Provide evidence-based decision support for managing the ecosystem.



Redraw from Stramma et al. 2010

Monitoring the West African marine ecosystem

Physical and biogeochemical levels

- Observation and modelling of ocean physics and biogeochemistry supporting the ecosystem approach to marine management
- Seasonal and long term variability of the environment
- Matching observation and simulations: towards predictions and early warning tools



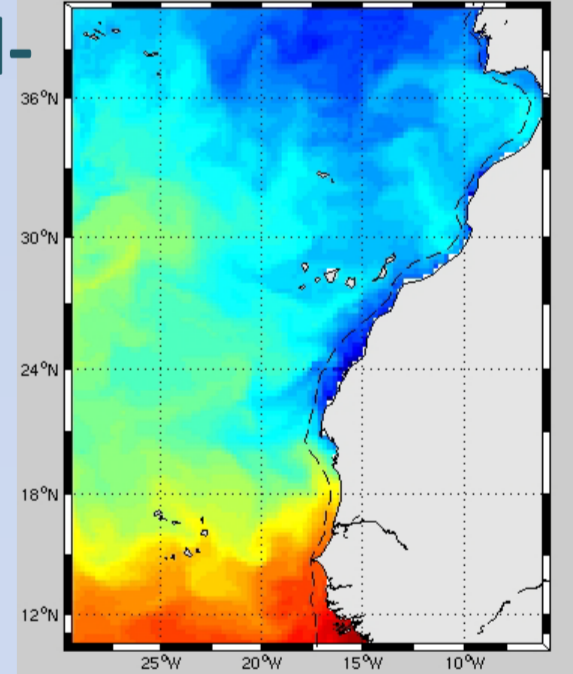
Ecological and biological levels

- Pelagic key components at the interface between the subtropical gyre and coastal upwelling (Phytoplankton to fish)
- Productivity and dynamics of oceanic small pelagic fish in their nursery, shelf and deep water/oceanic habitats
- Exchange processes and pelagic productivity at the estuarine interface

Ecological and biogeochemical modeling of the West African marine ecosystem

- Factors controlling the primary production
- Processes maintaining the OMZ
- Role of sub-mesoscale processes on primary production
- Spatio-temporal variability of pelagic key species
- Growth, reproduction, and mortality of fish pelagic fishes, e.g. *Sardinella aurita*
- Temporal evolution of fish habitats

Coupled physical-biogeochemical model (ROMS-PISCES)



ROMS-PISCES & IBM

Integrating Economics into the ecosystem approach to marine management

Determine the **optimal management of key fish species**, taking into account economic and ecological drivers and constraints.

Focus on the **effects of environmental variability and climate change** on economic performance and indicators

- Optimal economic-ecological management of selected key-species under environmental uncertainty
- Spatial economic-ecological approaches
- Ecosystem, economic, and fish based indicators of global change in West Africa

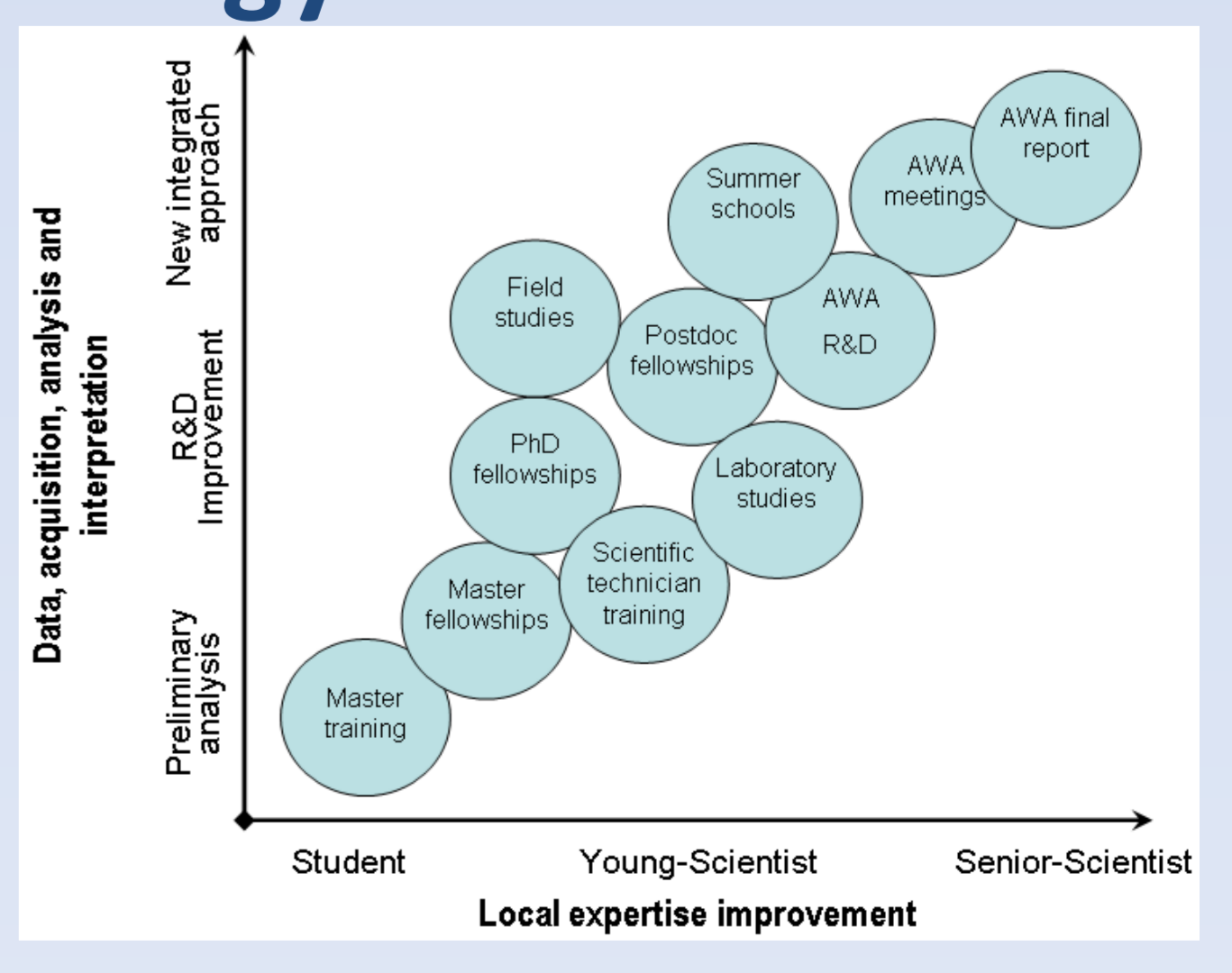


Education, Training and Capacity Building in physical oceanography and marine ecology in West Africa

To coordinate, and reinforce existing training capacities in oceanography

Enforcement of local scientific expertise to develop management instruments

The AWA international consortium



Associated partners:
United Kingdom, Greece, Belgium, Portugal, USA