

7-10 JULY 2015  
PARIS, FRANCE

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International  
Scientific Conference

## Session Report

2209 - Transformative pathways to sustain marine ecosystems and their services under climate change

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### 1. What are the session key findings? What are the new Lesson(s) learned / Scientific progress (since AR5 release, if relevant)?

- Robust scientific evidences of climate change impacts on marine ecosystems: distribution changes, production changes, phenological changes, ocean acidification impacts, with consequences for the social and economically-dependent communities (see reports of the International Symposiums on the Effects of Climate Change on the World's Oceans; 2008, 2012, 2015).
- Identification of key parameters to consider when modelling climate change impacts on marine ecosystems: model resolution, model selection, uncertainty (scenario uncertainty, model uncertainty, and internal variability), use of multi-models approach and models intercomparison.
- Climate models have been improved; they are now able to better represent past changes and identify biases in temperature in order to correct them, but they still have significant uncertainties and biases in the ocean domain, in particular in upwelling and western boundary current regions.
- Impacts of climate change on marine ecosystems reverberate on human security with social and political consequences (e.g., cultural impacts on indigenous people and potential changes in fisheries management).

### 2. What are the major knowledge Gaps and Research Needs identified in the session?

- Important to focus research on detailing general trends highlighted by recent research (cf part 1.): heterogeneity of distribution changes and habitat impact on adaptive capacity, impacts of climate change on upwelling ecosystems, ocean acidification (deviations and acclimations).
- A global zooplankton observing system is needed. It is a key compartment in ecosystem functioning that is predicted to be greatly affected by climate change (change in size/species composition).
- Need to better understand and model possible changes in sea ice cover and ice edge that can greatly affect marine ecosystems in high latitudes.

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- Need to systematically quantify the full range of uncertainties, including the potential for biological acclimation and adaptation to climate change and interactions between fishing and climate change on marine ecosystems and fisheries.
- Need to better understand the impacts of climate change on human society since it will notably have social and political consequences: cultural impacts (indigenous people), political consequences (exploratory fisheries, change of distribution).

### **3. Did the session discuss/identify promising approaches in the fields of Adaptation and Mitigation, or both?**

- Fisheries rebuilding can compensate for most impacts predicted at temperate and high latitudes. The situation in the tropics is much more uncertain, and necessitate immediate actions to improve ecosystem health and fish stocks status.
- Climate change is not generally accounted for in fisheries management. Given the potential impacts on transboundary stocks and of geographical shifts, there is a need to evolve fisheries management to account for climate change. This need would involve regional fisheries organizations and may need the consideration of management of the oceans commons (e.g. the Law of the Sea).
- Climate change management is about managing risks: need to produce risk assessments and vulnerability footprints to communicate results to policy-makers.
- Importance of communicating climate change impacts predictions and associated uncertainty, since climate change impacts cascade through society that can have a feedback effect (consumers, political pressure...)

### **4. Are there take-home messages from the session?**

- For policy-makers/COP21 negotiators and practitioners: important to continue the effort in rebuilding fisheries (can compensate for most climate change impacts in high and temperate latitudes). Need to focus on tropics where severe impacts are predicted. A 2 degrees increase in temperature already corresponds to important impacts on marine ecosystems that have to be accounted for.
- For private sector: important to account for climate change, especially associated changes in distribution that can greatly impact future fisheries and associated management (example of the tuna distribution in the Indian Ocean).
- For NGOs/citizens: climate change impacts cascade through society, but possible feedback effects. Importance of following research progress and increase public awareness of future impacts since society can amplify/reduce potential impacts.
- For scientists: Important to focus research on detailing trends highlighted by recent research, and to communicate research to society. Uncertainty is not be considered as a brake on communicating results.

### **5. Are there Important Quotes from the session?**

### **6. Please include any other remark that you might have.**