Session Report

L1.3 - Climate Change and Ocean Systems: Impacts and Feedbacks

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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)?

- Ocean is a climate integrator as it has a major role in mitigating climate change (CO2 absorption, atmospheric heat accumulation, continental waters recipient)
- The cost is: ocean acidification, ocean warming, ocean deoxygenation, sea level rise.
- Impacts of such profound changes in the physics and chemistry of the ocean are already detectable on a wide range of organisms, species and ecosystems (warm water coral reefs are at the frontline)
- Impacts are also already detectable at all latitudes.
- Projections on the impacts show that although a +2°C (air temperature, that will correspond to +1.2°C in Sea surface temperature) will aggravate the current situation, it will keep the range of impacts within a “manageable space”, then constituting a “threshold” compared to more warming scenarios.
- These changes pose serious question on various human-related dimensions, especially food security.

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

Knowledge gaps:
- A major knowledge gap emphasized during the session deals with the response of various species and ecosystems to these stresses (in situ, latitudinal shifts, etc.), including the changes to be expected in the interactions between species.
- Science is not know able to translate the knowledge into a winners/loosers ratio in order to better identify where the hot spots are, which societies will be impacted first and/or more than others, and so what will be the implications in terms of development, international trade markets, etc.

Research needs:
- To measure the gain/loss ratio in the fields of biodiversity and ecosystem services notably.
To develop a multiple-stressor approach combining various physical and chemical processes (warming + acidification + deoxygenation) to better identify the range of impacts and key thresholds.

Then also develop the understanding of the impacts of such changes in marine life on societies around the world, on economic sectors notably (identify various types of vulnerabilities)

A discussion also arose on the way scientists could interact with the negotiation arena, notably on the “+2°C target in 2100” that is a political target (cf. the Copenhagen Accord) but that poses problems from a scientific point of view, some of the panelists rather pushing for a +1.5°C limit. So there is clearly a need to better identify the main differences in terms of impacts on marine life and human societies of a +1.5°C and a +2°C worlds (2100 horizon).

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

Not really, mainly due to a lack of time.

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

(When relevant, please specify targeted group of stakeholders. For example, policy-makers / COP21 negotiators, practitioners (experts, etc.)/NGOs, private sector, citizens, media, etc.)

- Changes in the ocean due to greenhouse gas emissions are already detectable, at all latitudes.
- RCP2.6 trajectory will keep these changes in a manageable space (although this world will be very different compared to the current one), while less stringent emission scenarios will lead to a situation that will be much more complex (to be managed).
- Changes in the ocean are also a urge matter for sustainable human development.
- Threats in the ocean due to climate change constitute a compelling argument to push for high ambitious as possible commitments at COP21, and after.

5. Are there Important Quotes from the session?

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