

Ocean Acidification in upcoming IPCC Assessment

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Role of Oceans

- Oceans currently absorb 1/3 of fossil fuel CO₂ emitted to the atmosphere
- Ocean acidification a critical component of global change
 - Potentially responsible for a wide range of impacts
 - More CO₂ mitigation may be required because acidification limits the ability of oceans to absorb CO₂

Ocean acidification in previous IPCC assessment reports

- Considered biogeochemical and temperature effects of anthropogenic carbon on the oceans
- Direct impacts of ocean acidification not fully assessed

AR4 SYR: *While the effects of observed ocean acidification on the marine biosphere are as yet undocumented, **the progressive acidification of oceans is expected to have negative impacts on marine shell-forming organisms and their dependent species***

AR4 WG2 TS: ***Ocean acidification is an emerging issue** with potential for major impacts in coastal areas, but there is **little understanding of the details**. It is an **urgent topic for further research**, especially programmes of observation and measurement*

Cross Cutting Theme

- Major issues concerning biogeochemical cycles, ocean acidification, and feedback mechanisms
- Process knowledge including direct CO₂ effects ('fertilization') on ocean acidification
- Interactions among CO₂ effects, climate, and other stressors
- Past dynamic, present day budgets and projections of atmospheric CO₂, other GHGs and ocean pH including of relevant feedbacks
- Sensitivity of major carbon pools to changes in climate and impacts of changing biogeochemistry on biological productivity

Ocean acidification in AR5 outline

Working Group I

Chapter 3. Observation Oceans

Ocean biogeochemical changes, including ocean acidification

Chapter 6: Carbon and Other Biogeochemical Cycles

Processes and understanding of changes, including ocean acidification

Working Group II

Chapter 6. Ocean systems

Water property changes, including temperature and ocean acidification

Chapter 30. Open Oceans

Joint WG I/II Workshop

January 2011 Okinawa /Japan

- **Synthesis of observations** and projections of ocean CO₂ and seawater pH including geochemical carbon budget studies for open and coastal ocean systems;
- **Summary of experiments** on biological and ecosystem impacts of ocean acidification, including **combined effects of ocean acidification and climate change** and the implications for **livelihoods and food security**
- Possible ecosystem modeling techniques

