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Antarctic Climate Change and the Environment: an Update

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Summary

This paper is the third update report to the ATCM since the publication of the SCAR Antarctic Climate Change and the Environment (ACCE) report (Turner *et al.*, 2009). The ACCE report was a first step in compiling a comprehensive assessment of scientific information on the climate system and ecosystem responses to change in the Antarctic and Southern Ocean region. A PDF version of the full report is available from: <http://www.scar.org/publications/occasionals/acce.html>.

Background

The Antarctic climate system varies on time scales from orbital, to millennial to sub-annual and is closely coupled to other parts of the global climate system. The ACCE report discussed these variations from the perspective of the geological record and the recent historical period of instrumental data (approximately the last 50 years), discussed the consequences for the biosphere, and documented the latest numerical model projections of changes into the future, taking into account human influence due to the release of greenhouse gases and chlorofluorocarbons to the atmosphere. The report highlighted the large uncertainties in the vulnerability of the West Antarctic Ice Sheet (WAIS). The profound impact of the ozone hole on the Antarctic environment over the last 30 years, shielding the continent from much of the effect of global warming, was noted. However, this effect is not expected to persist. Over the next century ozone concentrations above the Antarctic are expected to recover, and if atmospheric greenhouse gas concentrations continue to increase at the present rate, temperatures across the continent are projected to increase by several degrees and sea ice will be reduced by about one third.

Update

This original ACCE document contained 80 'key points' that represented an Executive Summary of the full report, highlighting important climatic events affecting the Antarctic, documenting the major changes, considering how the biota has been affected and giving estimates of future change. The SCAR ACCE Expert group (<http://www.scar.org/researchgroups/acce/>) have been working on an update to these 80 key points, incorporating material included in previous ATCM updates, making use of results emerging from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report, and also rectifying some omissions identified in the original report, such as consideration of the impact of solar variability on the Antarctic climate. This update, which is much more comprehensive than previous updates (at around 18,000 words), is currently being finalised for submission to a peer-reviewed journal. Once published the SCAR Secretariat will ensure Treaty parties are informed.

Reference

Turner, J., Bindshadler, R. A., Convey, P., di Prisco, G., Fahrbach, E., Gutt, J., Hodgson, D. A., Mayewski, P. A., and Summerhayes, C. P. 2009. Antarctic Climate Change and the Environment, 526. Cambridge, Scientific Committee on Antarctic Research.