Paleoclimatological context and reference level of the 2°C and 1.5°C Paris Agreement long-term temperature limits.

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ABSTRACT

The Paris Agreement adopted in December 2015 during the COP21 conference stipulates that the increase in the global average temperature is to be kept well below 2°C above "pre-industrial levels" and that efforts are pursued to limit the temperature increase to 1.5°C above "pre-industrial levels". In order to further increase public acceptance of these limits it is important to transparently place the target levels and their baselines in a paleoclimatic context of the past 150,000 years (Last Interglacial, LIG) and in particular of the last 10,000 years (Holocene; Present Interglacial, PIG). Intense paleoclimatological research of the past decade has firmed up that pre-industrial temperatures have been highly variable which needs to be reflected in the pre-industrial climate baseline definitions. The currently used reference level 1850-1900 represents the end of the Little Ice Age (LIA).The LIA represents the coldest phase of the last 10,000 years when mean temperatures deviated strongly negatively from the Holocene average and which therefore are hard to justify as a representative pre-industrial baseline. The temperature level reached during the interval 1940-1970 may serve as a better reference level as it appears to roughly correspond to the average pre-industrial temperature of the past two millennia.

Highlights:

- The 2015 Paris Climate Agreement does not define its "pre-industrial reference level"
- Holocene temperatures have been variable which must be reflected in the baseline
- This paper places the climate goal of the Paris Agreement in a paleoclimatic context
- Common reference level marks end of the Little Ice Age, a Holocene cold anomaly
- Interval 1940-1970 may be a more neutral baseline in the Holocene climate context

About the Speaker

Sebastian Luening, holds a doctorate in geology/palaeontology and has been working for 20 years on the reconstruction and interpretation of natural ecological changes of the geological past. After research at the Universities of Wales, London, Manchester and Bremen, he took on a visiting professorship at the University of Vienna in 2005/2006. He has received several awards both for his university studies and academic research. Since 2007 he has been working as Africa and South America expert in the oil and gas industry. Luening is a reviewer for several international geoscience journals and has been evaluating study proposals for a number of national science foundations. He has been a member of the American Geophysical Union (AGU) since 1991. Together with Prof. Fritz Vahrenholt he co-authored the book 'The Neglected Sun' which was published in 2013 and highlights the important role of natural climate cycles in past and current climate change. Sebastian currently lives in Lisbon, Portugal.