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About climate change

physikalisches

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The Earth's equilibrium climate sensitivity (ECS), defined as the steady-state global temperature increase for a doubling of CO_2 , has been estimated by the Intergovernmental Panel on Climate Change (IPCC) (2013) to lie between 1.5 K to 4.5 K.

More recently, consistent evidence points to a climate sensitivity near the middle or upper part of this range. In addition, some studies indicate a change in the frequency and intensity of climatic extremes. The goal of this presentation is

- 1) to give a description of the main climate processes responsible for these changes and their uncertainty, and
- 2) to describe some aspects of the research conducted by Klaus Hasselmann, one of the three physics Nobel Prize winners in 2021, assessing evidence for the detection of anthropogenic influences on the climate.

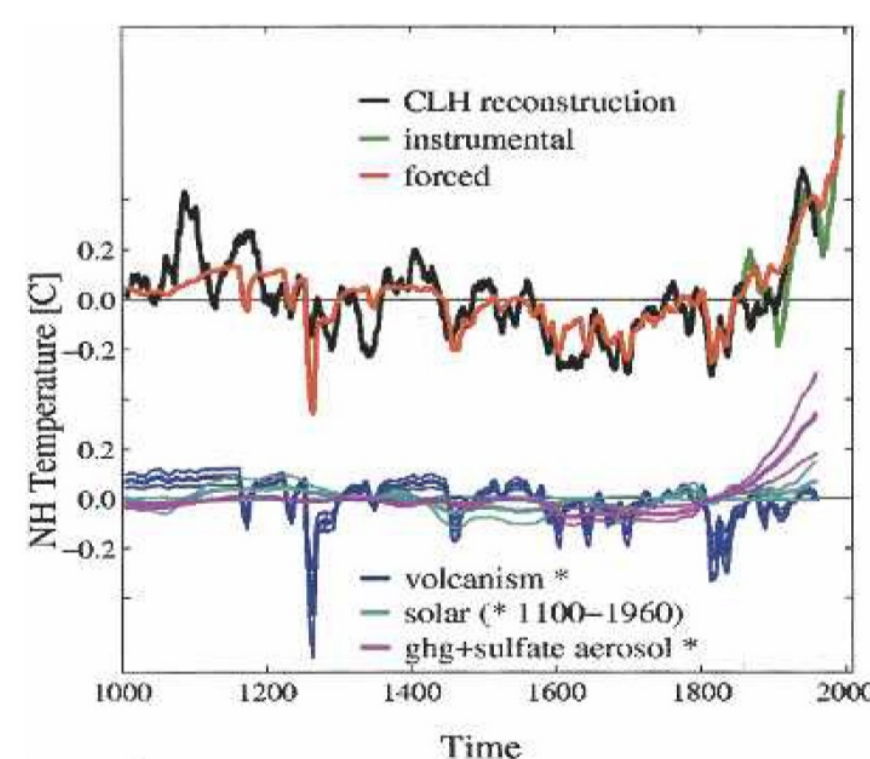


FIG. 2. Contribution of external forcing to an updated record of NH mean temperature north of 30°N (Crowley and Lowery 2000). (top) Comparison between the paleoreconstruction (black), the instrumental record (green), and a best combination of solar, volcanic, and anthropogenic forcing from an EBM simulation (red). (bottom) Contribution from each forcing estimated by a multiple regression (the thick curve indicates the best guess and the thin curves indicate the 5%–95% uncertainty range). An asterisk denotes a response that is detected at the 5% significance level. Internal climate variability is estimated from the residual paleovariability. After Hegerl et al. (2003).

Extracted from the Review Article from the International Ad Hoc Detection and Attribution Group, *Journal of Climate*, 2005.