



Sensitivity of simulated tropical climate variability and its global teleconnections to reconstructed volcanic eruptions and solar irradiance fluctuations over the last millennium

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Tropical climate variability based on proxy reconstructions for the last millennium suggests important interannual to decadal changes probably modulated by external forcing such as volcanic eruptions and solar irradiance fluctuations. For example these proxy reconstructions suggest a warming of the Pacific warm pool (Newton et al 2009), a low ENSO variance and a northward shift of the ITCZ during periods of increased Total Solar Irradiance (TSI) and low volcanic activity such as during the so-called Warm Medieval Period (Haug et al, 2001; McGregor et al, 2009). The opposite situation is suggested for the Little Ice Age (LIA), a climatic period around the Maunder Minimum characterised by higher volcanic activity and small, yet sizable reduction of the TSI. Furthermore, first evidence suggest a significant role played by such tropical changes in driving teleconnected megaflood/megadroughts and threshold-like response in monsoons over South and North America while modulating significantly the climate of the North Atlantic region during the Warm Medieval Period and the Little Ice Age (Rein et al., 2004; Moy et al., 2002; Conroy et al. 2009; McGregor et al, 2009; Seager et al, 2008; Sicre et al, 2008...).

In link with these issues, we will explore tropical Pacific climate variability and its tropical and extra tropical teleconnections in particular over the Americas and North Atlantic, in externally forced and unforced millennial-long simulations run with the IPSL model. This will allow us evaluating the sensitivity of tropical Pacific internal dynamics and global teleconnections to the applied reconstructed volcanic and solar forcings for this period and hopefully shade some light on the processes underlying proxy-based reconstructions for the last millennium climate variability.