

The Atlantic Multidecadal Oscillation: A Perspective from Paleo Archives

Delia W. Oppo, Anne L. Cohen, Luis Vasquez-Bedoya, P. Blanchon

Instrumental observations reveal that Atlantic sea surface temperatures (SSTs) are characterized by multi-decadal variations, having a period of approximately 60-80 years [Enfield *et al.*, 2001]. Some studies suggest that this so-called Atlantic Multidecadal Oscillation (AMO) arises from internal variability linked to the Atlantic Meridional Overturning Circulation [Delworth and Mann, 2000; Knight *et al.*, 2005; Zhang *et al.*, 2007; Zhang, 2008] whereas other studies suggest that it is linked to global warming [e.g. Trenberth and Shea, 2006]. Several AMO reconstructions extend into the pre-instrumental era. The first studies were based on tree ring width chronologies [Gray *et al.* 2004; Mann *et al.*, 2008], in which it was assumed that the connection between North Atlantic SSTs and tree ring widths remained constant through time. Our approach [Vasquez-Bedoya *et al.*, 2012] was to reconstruct SSTs using corals cores recovered from the eastern Yucatan Peninsula, in the Atlantic Warm Pool (AWP), where SSTs parallel the AMO [Wang *et al.*, 2006]. We first showed a strong correlation between growth rates of several corals and local SST, and directly calibrated growth rates to SST. We applied the calibration to extend the SST record to 1775 AD, when the oldest coral colony we sampled began to grow. The tree ring and coral-based chronologies all agree in suggesting that Atlantic multidecadal SST variability pre-dated the instrumental era.