



Conference on Teleconnections in the Atmosphere and Oceans
17 - 20 November 2008, ICTP Trieste, Italy

Low-frequency Climate Variability in the Atlantic Basin during the 20th Century
Y. M. Tourre¹, S. Paz², Y. Kushnir¹, J. Brolley³, and W. B. White⁴

¹ LDEO of Columbia University, Palisades, New York, USA

² Department of Geography and Environmental Studies, University of Haifa, Haifa, Israel

³ Egecat, Inc., Oakland, CA, USA

⁴ University of California, San Diego, La Jolla, CA, USA

Abstract

More linkages between the Atlantic Multi-decadal Oscillation (AMO, and thermohaline circulation), the Polar Vortex Oscillation (PVO, and vorticity intrusion), the North Africa-West Asia index (NAWA, and NA- WA- poles) and Sahelian rainfall, are investigated. Significant positive correlations are found between winter/spring AMO and spring NA pole. Significant positive (negative) correlations are found between winter PVO, and NAWA (WA pole). Moreover, two low-frequency climate signals dominated natural climate variability over the Atlantic Basin during the 20th century, namely the AMO, and the Quasi-Decadal Oscillation (or QDO). The AMO is linked to the oceanic thermohaline circulation, whilst the QDO is associated with low-frequency atmosphere-ocean interactions. They are linked to large scale Atlantic sea surface temperature (SST) and sea level pressure (SLP) patterns, thus to the Atlantic Meridional Mode (AMM) and the North Atlantic Oscillation (NAO). The low-frequency variability of the tropical Atlantic SST, ITCZ location, Sahelian rainfall, tropical Atlantic storms (pressure, mean wind speed and latitudes) are also correlated. In a climate change context the AMO and QDO signals could be modified with important socio-economical impacts (Munich Re Group, 2006).