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Could ENSO's response to the 11-yr solar forcing be modulated by Atlantic Multidecadal Variability?

Francisco J. Alvarez-GarcÍa, William Cabos, and Miguel Á. Hidalgo
Department of Physics and Mathematics, University of Alcala (Spain)

The Atlantic Multidecadal Oscillation (AMO) is brought here into the debate concerning the response of the tropical Pacific to the 11-year solar forcing. While it has been pointed out that coupled feedbacks in the tropical Pacific atmosphere-ocean system could amplify this solar signal, yielding a distinct response to it, other works fail to detect any significant correlation between the solar signal and tropical Pacific indices. It is thus suggested that connections could be spuriously established by attributing a solar origin to internal climate variability of decadal timescale. The possibility that the AMO could modulate the response of the tropical Pacific to the solar cycle, linking the presence of 9- and 13-year period peaks in tropical Pacific climate variability to the 11-year solar cycle, is investigated here. Such modulation, consistent with the lack of significant linear correlation with the solar signal, might arise from AMO-induced changes of the atmosphere-ocean coupling, which would condition the reaction of the tropical Pacific to the solar forcing. Our analysis consists in computing composite differences of Sea Surface Temperature (SST) anomalies in the tropical Pacific, for high minus low solar activity years, during intervals of positive and negative AMO phase, respectively. From the comparison of the results for those different periods, we examine the hypothesis that AMO could modulate the response of the tropical Pacific to the 11-year solar cycle. Solar variations are monitored through the International Sunspot number, available from the Monthly Report of the International Sunspot Number, online catalogue, of the Royal Observatory of Belgium. SST in the tropical Pacific are taken from the HadISST1.1 dataset.