

The effect of Milankovitch variations in insolation on equatorial seasonality

Yosef Ashkenazy¹, Ian Eisenman², Hezi Gildor³, Eli Tziperman⁴

¹*Ben-Gurion University , Midreshet Ben-Gurion, Israel*

²*California Institute of Technology, California, USA*

³*Weizmann Institute, Rehovot, Israel*

⁴*Harvard University, Cambridge , USA*

Keywords: *equatorial dynamics, coupled GCM, seasonality*

Although the sun crosses the equator twice a year, at the equinoxes, at times in the past the equatorial insolation has had only one maximum and one minimum throughout the seasonal cycle due to Milankovitch orbital variations. Here we use a state-of-the-art coupled atmosphere-ocean general circulation model to study the effect of such insolation forcing on equatorial surface properties including air and sea temperature, salinity, winds, and currents. We show that the equatorial seasonality is altered according to the insolation, with, for example, either maximal sea surface temperature (SST) close to the vernal equinox and minimum SST close to the autumnal equinox, or vice versa. Our results may have important implications for understanding tropical climate, as well as for the interpretation of proxy data collected from equatorial regions.