12.818: INTRODUCTION TO ATMOSPHERIC DATA AND LARGE-SCALE DYNAMICS

PROJECT FOUR: THE MERIDIONAL STRUCTURE OF THE ATMOSPHERE

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In this project we will investigate the nature of convection in the lower troposphere, which is the mechanism responsible for transporting heat from terrestrial radiation vertically upward to the upper troposphere where water vapor concentration and thus infrared absorption is much lower, allowing it to be emitted to outer space.

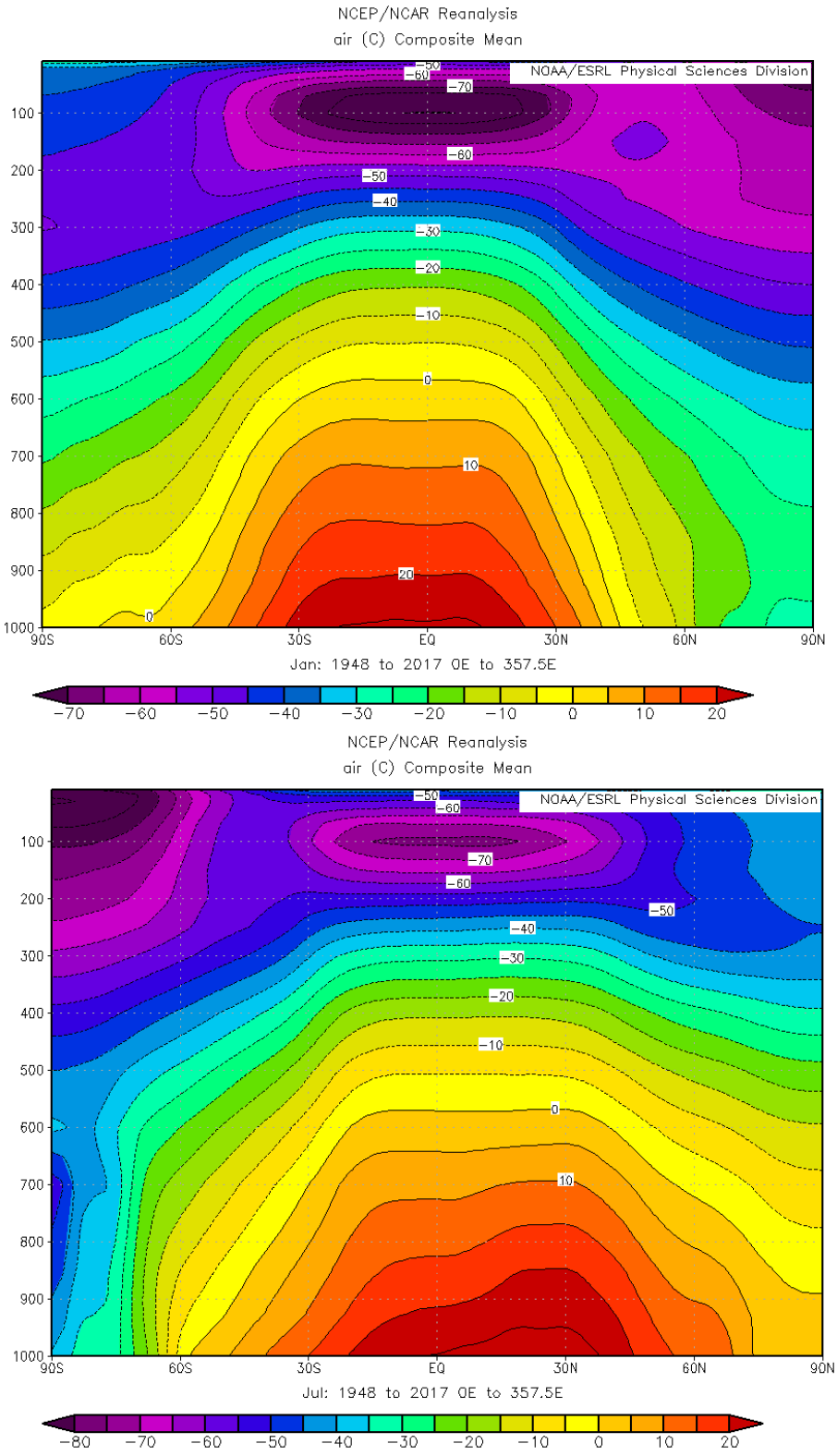

Figure 1: Zonally averaged surface air temperatures (in °C) for the months of January and July produced using using NCEP reanalysis data averaged over the years 1948–2017.

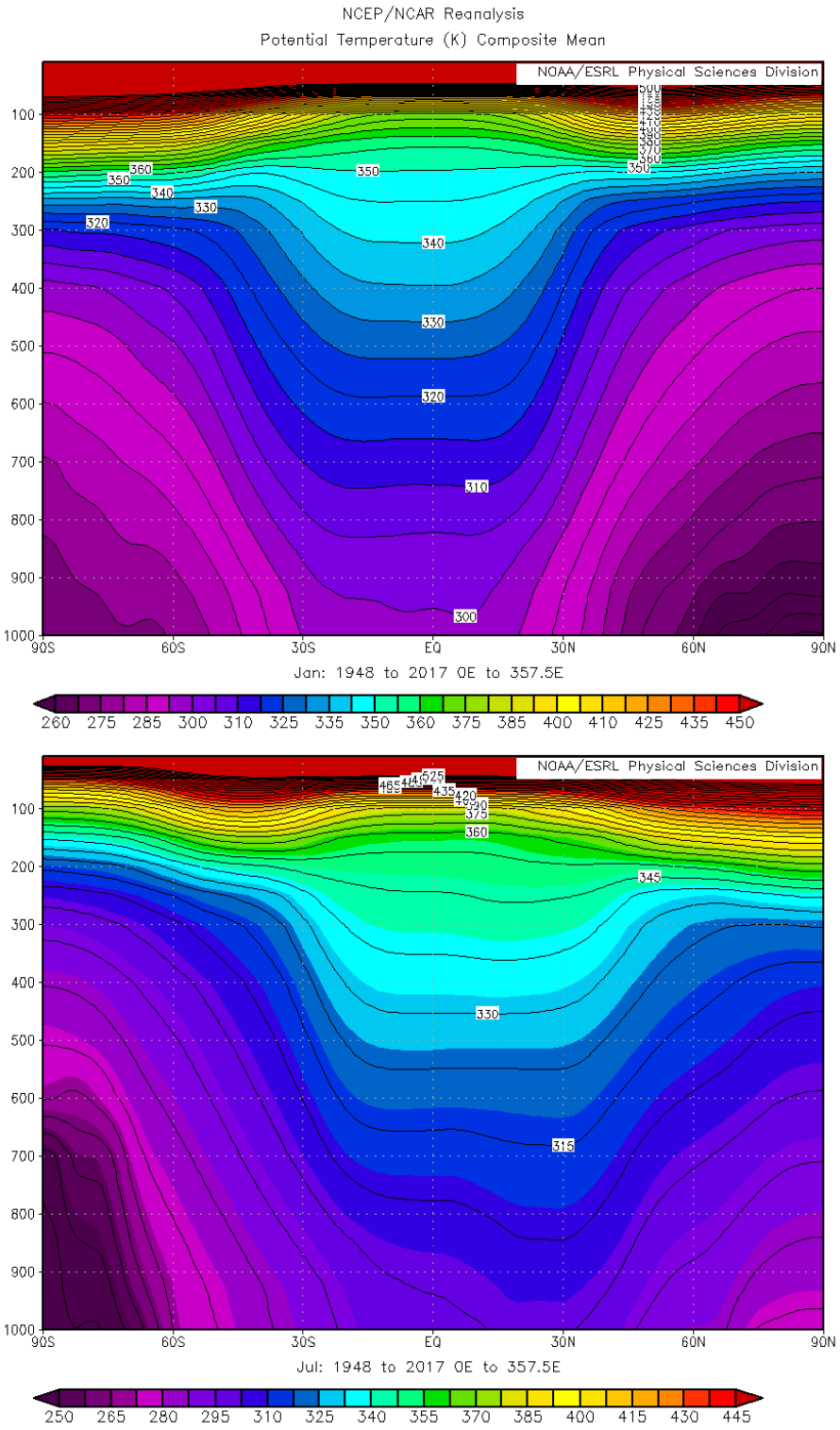

Figure 2: Zonally averaged potential temperatures (in units of Kelvin) for the months of January and July produced using using NCEP reanalysis data averaged over the years 1948–2017.

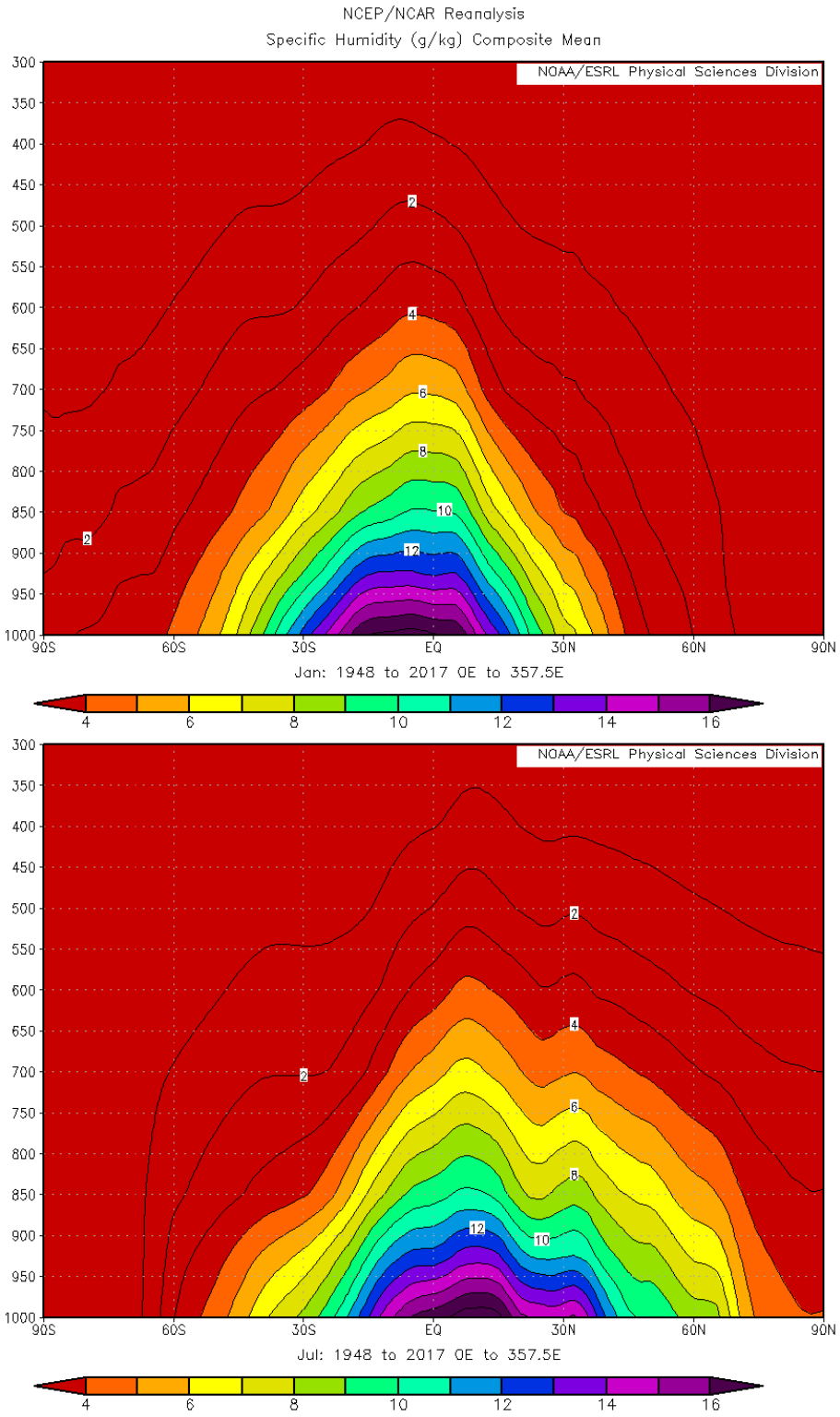

Figure 3: Zonally averaged specific humidity (in g/kg) for the months of January and July produced using using NCEP reanalysis data averaged over the years 1948–2017.

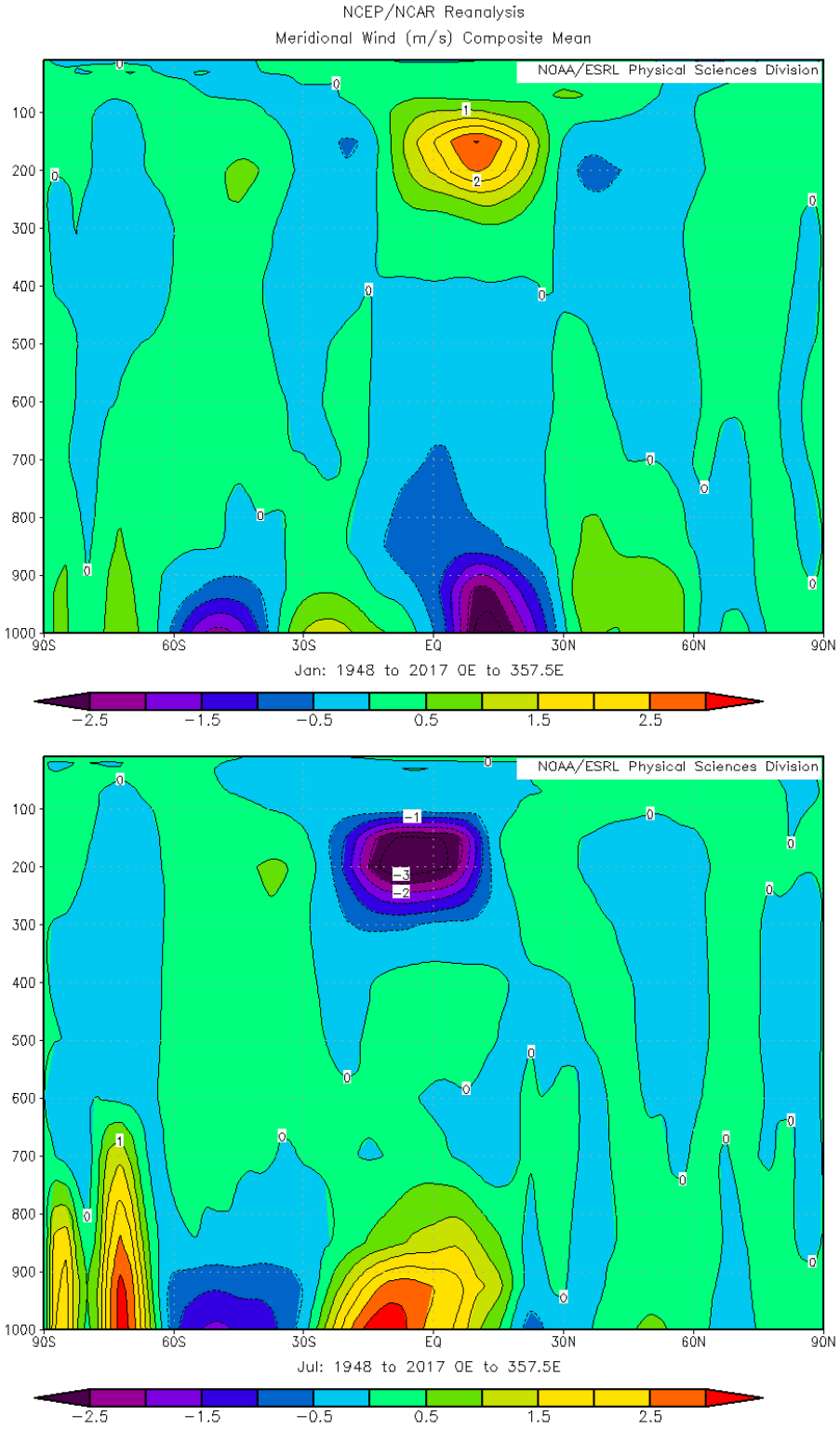

Figure 4: Zonally averaged meridional wind (in m/s) for the months of January and July produced using using NCEP reanalysis data averaged over the years 1948–2017.

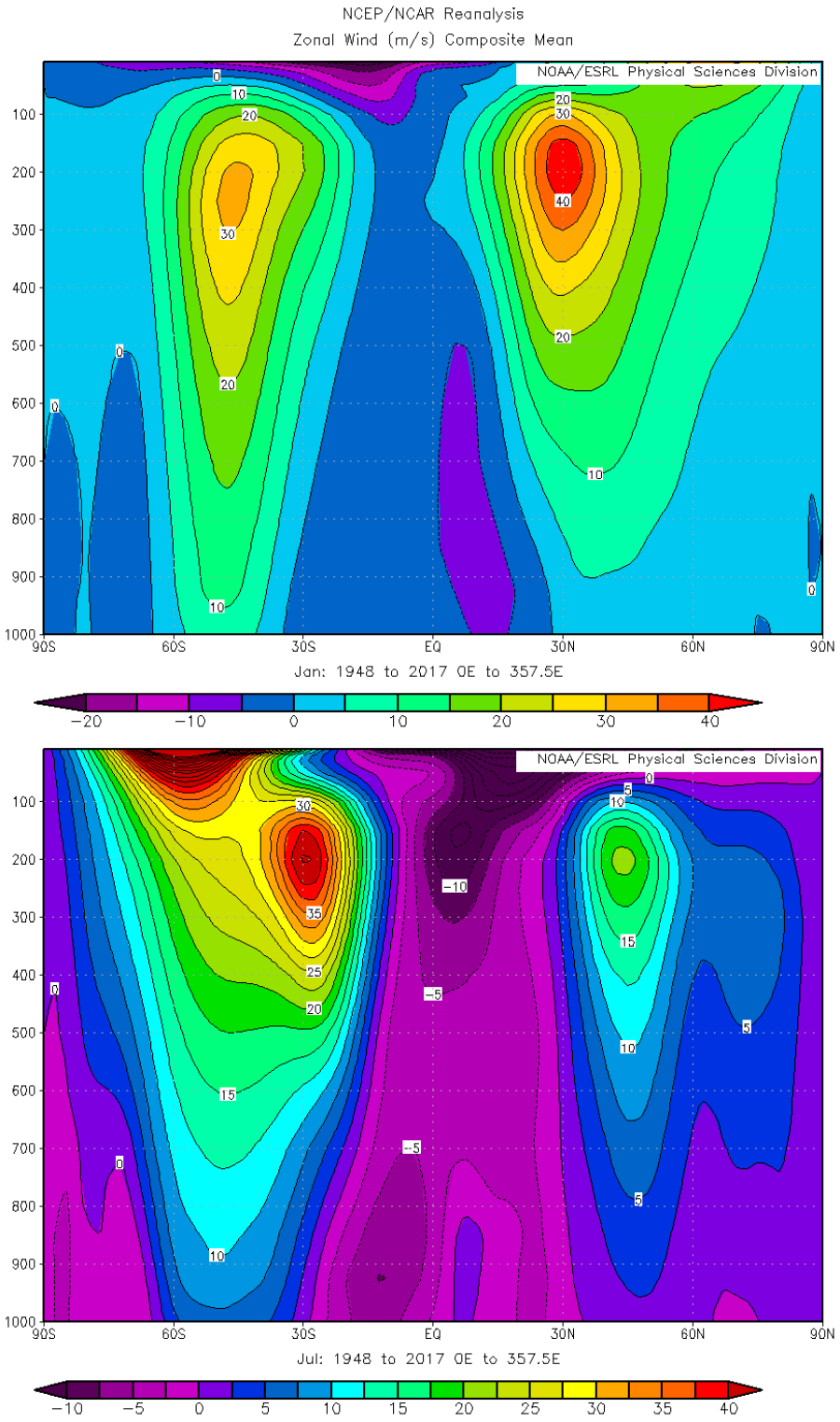

Figure 5: Zonally averaged zonal wind (in m/s) for the months of January and July produced using using NCEP reanalysis data averaged over the years 1948–2017.

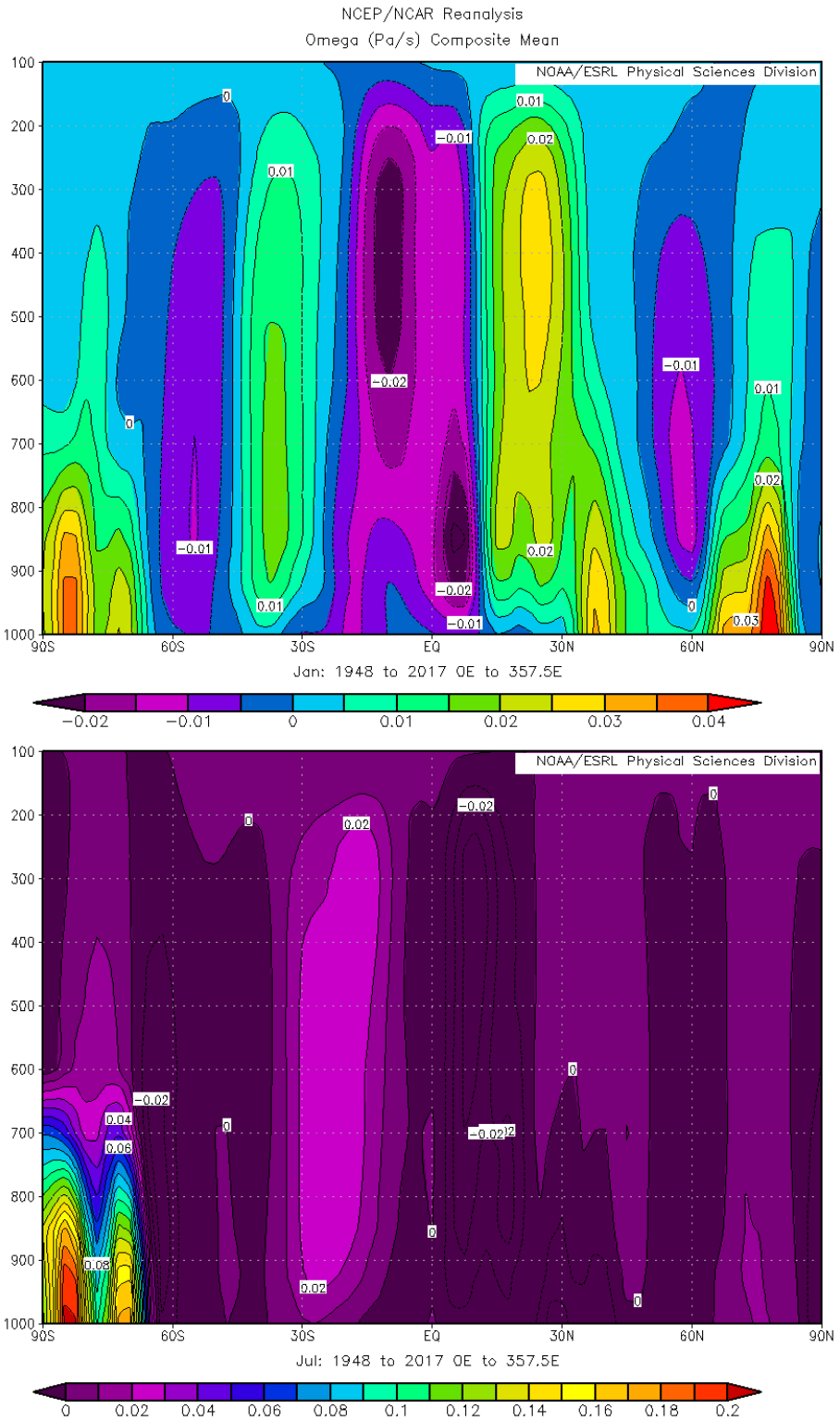

Figure 6: Zonally averaged vertical velocities (in Pa/s) for the months of January and July produced using using NCEP reanalysis data averaged over the years 1948–2017.