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Soil moisture variability over South America, as derived from the Global Land Data Assimilation System

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This works explores the main modes of variability of the root zone soil moisture in South America, with an emphasis on two particular regions of interest: the continental portion of the South Atlantic Convergence Zone (SACZ) and southeastern South America (SESA). This particular choice responds to the well documented see-saw pattern that characterizes warm season precipitation: positive (negative) rain anomalies over SACZ occur concomitantly with negative (positive) ones over SESA. To accomplish this, 10 years of soil moisture and other variables characterizing the surface state, together with precipitation, have been obtained from the Global Land Data Assimilation System. Very interesting differences show up, starting from distinct annual cycles: SESA does not exhibit a clear annual cycle, while SACZ is characterized by a "dry" period that starts by the beginning of June and ends by mid November. Still, the day to day variability is larger over SESA. Intraseasonal variability is also of interest and denotes years with very different behavior: some of them are characterized by the expected see-saw behavior, but some others are embedded in a longer time trend. This is confirmed with the aid of a spectrum analysis, which shows a clear peak around 70 days in both regions, and another one around 25 days. Soil moisture anomalies at SESA exhibit interannual variability in the range 2-5 years. Previous works addressing rainfall year-to-year variability in the same region, exhibits dominant activity in the same range of periods. That rainfall variability has been related to large-scale phenomena, like ENSO, SAM and the Indian Ocean Dipole. These preliminary results suggest that the analysis of soil moisture variability, may provide useful hints to further understand the role of soil states in driving part of the observed precipitation variability.