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A climate study of 500-hPa moving troughs in the Southern Hemisphere

Manoel A. Gan(1), Everson Dal Piva(2) and V. Brahmananda Rao(1)

(1) Instituto Nacional de Pesquisas Espaciais - INPE – Centro de Previsão de Tempo e Estudos (alonso@cptec.inpe.br - tel: 55-12-3945-6650)

(2) Universidade Federal de Santa Maria, Santa Maria – RS, Brazil

The location of 500-hPa troughs using an automatic method is studied with data from a 24 year period with the objective of determining the trough formation and dissipation regions in the Southern Hemisphere. To identify the 500-hPa mobile troughs we developed an objective method that uses the Eulerian Centripetal Acceleration (ECA). On an average 868 troughs per year were identified by the method, with an increasing trend during the period studied. The troughs have an average lifetime of 4.3 days, being longer (shorter) in subtropical (high) latitudes. The average phase velocity calculated was 13.6 m.s^{-1}, being higher (lower) in middle (high) latitudes. The troughs are normally found in the 60ºS to 40ºS latitudinal band, with maximum occurrence at 50ºS. The longitudinal distribution of trough genesis has 3 maximum regions, over Drake Strait and the South Atlantic Ocean, over the Indian Ocean around 50ºS, and over the southwestern Pacific Ocean between 150ºE and 150ºW. The trough dissipation regions are less concentrated than the genesis regions, and also show 3 maxima, over the west of Andes, south of the African continent, and south of Australia.

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