

1.5 A PERSPECTIVE OF MIDDLE-ATMOSPHERE DYNAMICS (MAD) STUDIES AT THE NEW INTERNATIONAL EQUATORIAL OBSERVATORY (NIEO)

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The equatorial region has attracted many MAD studies mainly based on data of limited locations and resolutions. At NIEO we can establish (i) Climatology of the equatorial middle atmosphere; all of the mean zonal flow, the meridional/east-west circulations and the planetary/gravity waves will be described based on massive, reliable data statistics. Indeed, MAD is a transition field between the meteorology and the aeronomy. We emphasize also the following two aspects of studies at NIEO; (ii) Troposphere-stratosphere coupling at the equator; the candidate location of NIEO is just at the "stratospheric fountain" area where the tracers and waves are pumped up into the middle atmosphere. (iii) Mesosphere-thermosphere coupling at the equator; thermospheric superrotation, which may be caused either by ion drag or by tidal breaking, will be examined in detail by observations covering a wide altitude range from the mesosphere through the thermosphere.

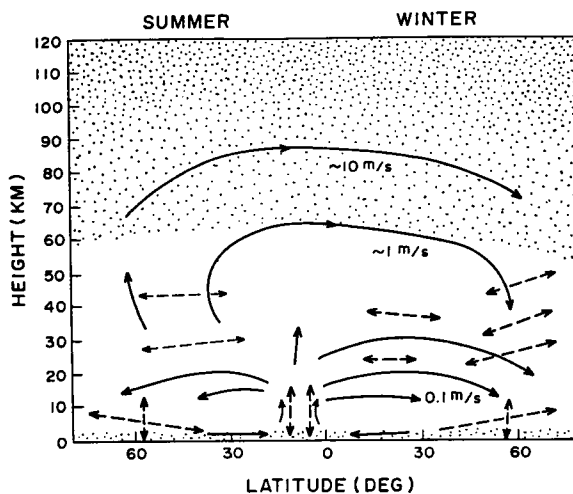


Figure 1. Schematic picture of the meridional circulations in a Lagrangian viewpoint [after Kida]

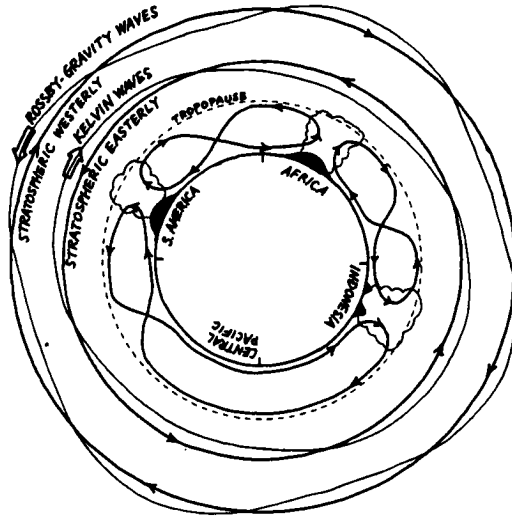


Figure 2. Schematic picture of the zonal structure of the equatorial atmosphere.

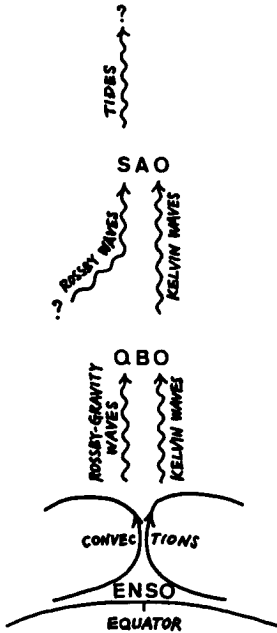


Figure 3. Schematic picture of the vertical propagation of equatorial waves.

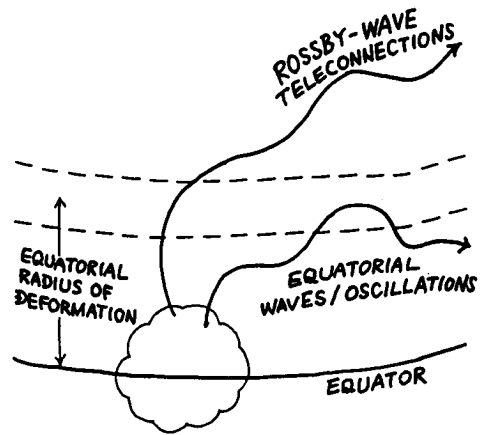


Figure 4. Schematic picture of the meridional propagation of "signals" generated at the equator.