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Monthly observations of mean winds and tides in the lower thermosphere for 1992 and 1993 by WINDII on UARS

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Monthly averaged zonal mean winds and diurnal and semidiurnal migrating tides at 90-120 km between 40S and 40N for 1992 and 1993 are derived using winds measured by the satellite-based Wind Imaging Interferometer (WINDII) on board the Upper Atmosphere Research Satellite (UARS). The zonal mean zonal winds are characterized by an annual variation of the eastward wind at mid-latitudes with a maximum in summer, and a semi-annual variation of the westward wind in the tropical region with maxima at equinoxes below 110 km. The zonal mean meridional winds are characterized by a summer-to-winter flow below 100 km in solstice months, and by a cell-like structure in equinox months, which is, to our knowledge, the first-ever observation of this structure. For the migrating diurnal tide, two distinct types, the (1,1) upward propagating mode and the evanescent mode, with comparable magnitudes are observed. The (1,1) mode is dominant in the subtropical regions below about 105 km and has a semi-annual variation with a maximum in March/April and a much weaker maximum in September/October. The evanescent mode is dominant mainly at latitudes above 20 deg. N/S and altitudes above 100 km, and has an annual variation with a maximum in the summer months. The combination of the two modes produces a double-peaked structure in the vertical amplitude profile. The migrating semidiurnal tide of both the zonal and meridional components is stronger in April-September than October-March, as a result, in the southern hemisphere the semidiurnal winds are stronger in winter than in summer, and it is the reverse in the northern hemisphere. A climatology using all available WINDII winds between 1992 and 1997 are also produced and can be obtained by request.