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VARIATIONS OF THE IONOSPHERIC F2-LAYER AT ZHONGSHAN STATION, ANTARCTICA

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Digital ionosonde data of one solar cycle (Feb., 1995-Dec., 2004) at Zhongshan Station (*69°22'24"S, 76°22'40"E*), Antarctica are used to study the ionospheric variations in the critical frequency of the F2 layer, foF2. In the daily variation the diurnal component is dominant compared to the semi-diurnal one. In the seasonal variation the annual component is larger than the semiannual one. There is a "magnetic noon anomaly" in the daily variation of foF2, which means the maximum value of foF2 occurs at magnetic noon rather than local noon. There is no obvious "seasonal anomaly" in the seasonal variation of foF2 during lower solar activities, but there is "semiannual anomaly" during higher solar activities. The mechanisms of the phenomena are discussed in the paper. The solar zenith angle effect, the magnetospheric driven factors (particle precipitation and polar convection electric field), and the ambient atomic/molecular concentration are considered to explain the observed phenomena. A three dimensional time-dependent model of the polar ionosphere was developed. The model calculations are compared with observations and the results support the physical explanation to some extent.