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Comparison of thermospheric winds measured by GOCE and ground-based FPIs at low and middle latitudes

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The reestimates of thermospheric winds from the Gravity field and steady-state Ocean Circulation Explorer (GOCE) accelerometer measurements were released in April 2019. In this study, we compared the new-released GOCE crosswind (cross-track wind) data with the horizontal winds measured by four Fabry-Perot interferometers (FPIs) located at low and middle latitudes. Our results show that during magnetically quiet periods the GOCE crosswind on the dusk side has typical seasonal variations with largest speed around December and lowest speed around June, which is consistent with the ground-FPI measurements. The correlation coefficients between the four stations and GOCE crosswind data all reach around 0.6. However, the magnitude of the GOCE crosswind is somehow larger than the FPIs wind, with average ratios between 1.37-1.69. During geomagnetically active periods, the GOCE and FPI derived winds have a lower agreement, with average ratios of 0.85 for the Asian station (XL) and about 2.15 for the other three American stations (PAR, Arecibo and CAR). The discrepancies of absolute wind values from the GOCE accelerometer and ground-based FPIs should be mainly due to the different measurement principles of the two techniques. Our results also suggested that the wind measurements from the XL FPI located at the Asian sector has the same quality with the FPIs at the American sector, although with lower time resolution.