



Validation of ECMWF ERA-40 tropical lower stratosphere temperatures and winds with long-duration balloon data

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24 long-duration tropical balloon flights from 1989 to 2001 are used for validation of ECMWF ERA-40 lower stratospheric temperatures, winds and trajectories. For temperatures good agreement is found with temperature errors of $\Delta T = 0.30 \pm 2.1$ K (median and 68% fractile). For the zonal winds a significant positive bias is found for the errors: $\Delta u = 0.86 \pm 3.9$ m/s (median and 68% fractile). The meridional wind errors are less noisy and exhibit no bias: $\Delta v = 0.01 \pm 3.2$ m/s (median and 68% fractile). For 18 flights trajectory comparisons were feasible. Trajectory errors of 512 ± 57 km after 5 days, 995 ± 131 km after 10 days and 1047 ± 157 km after 12 days were found when combining the results from the 18 flights.