The interannual variability in water vapour and sensible heat fluxes over beech forest in Denmark is analysed. A time-series from seven years (half hourly values) are investigated in regard to extremes and the interannual variability at daily and monthly time-scales. The fluxes are measured by the eddy correlation technique from a tall mast in the center of the forest. The experimental site is part of the CARBO-EUROFLUX network and observations include precipitation, soil water, CO2, temperature, humidity, solar radiation and plant parameters. In the current study focus is on the water balance. A comparison between the water balance components, CO2 and environmental parameters is undertaken. The results are part of EO-FLUX-BUDGET project (http://www.geogr.ku.dk/projects/eoflux/) aiming for spatial and temporal predictions of the water vapour, sensible heat and CO2 balance over the island Zealand (7.200 km2) in Denmark based on satellite Earth Observation data at high resolution. The validation part is based on the in-situ heat and water vapour flux observations presented here.