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On the detection of a high-altitude peak of atmospheric ozone by the NOMAD/UVIS onboard the ExoMars TGO

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The Nadir and Occultation for MArs Discovery (NOMAD) is a spectrometer suite onboard the ExoMars Trace Gas Orbiter (TGO), providing observations in the nadir, limb, and solar occultation modes since April 2018. UVIS, a single spectrometer unit within NOMAD spans the ultraviolet-visible range between 200 nm and 650 nm. It obtained ~ 4000 vertically resolved (< 1 km) solar occultation observations of the martian atmosphere for over a full Mars year (MY, 687 days) starting at MY 34 during late northern summer at L_s = 163°. Ozone (O_3), a principal component of the martian atmosphere, is highly responsive to the incoming UV flux, and is a sensitive tracer of the odd hydrogen chemistry. Transmittance spectra returned by UVIS sampled the O_3 Hartley band around 250 nm and provided unique insights into understanding the vertical, latitudinal and temporal behavior of O_3. UVIS detected a high-altitude peak of O_3 between 40 and 60 km that is mostly persistent between L_s = 340° and ~ 200° at polar latitudes, and is found to be highly dependent on latitude and season. We will present high-resolution results tracking the vertical, latitudinal, diurnal and seasonal evolution of the secondary peak of ozone for a full Mars year. In comparison, we will also provide O_3 simulations from the GEM-Mars General Circulation Model (GCM) with the purpose of shedding light into understanding the photochemical processes that lead to the presence and disappearance of the high-altitude peak of atmospheric ozone.