5.097 Global tropospheric ozone trend and variations from 2003 - 2011 as seen by SCIAMACHY.

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Abstract:

An analysis of the tropospheric ozone (O3) columns (TOCs) derived from SCIAMACHY limb-nadir-matching (LNM) observations during the period 2003–2011, focusing on global variations in TOC, is described. The changes are derived using a multivariate linear regression
model. TOC shows changes of -0.2±0.4%yr^{-1}, 0.3±0.4% yr^{-1}, 0.1±0.5% yr^{-1} and 0.1± 0.2% yr^{-1}, which are not statistically significant at the 2s level in the latitude bands 30–50^{0}N, 20^{0}S–0, 0–20^{0}N and 50–30^{0}S, respectively. Tropospheric O3 shows statistically significant increases over some regions of South Asia (1–3% yr^{-1}), the South American continent (up to 2% yr^{-1}), Alaska (up to 2% yr^{-1}) and around Congo in Africa (up to 2% yr^{-1}). Significant increase in TOC is determined off the continents including Australia (up to 2% yr^{-1}), Eurasia (1–3% yr^{-1}) and South America (up to 3% yr^{-1}). Significant decrease
in TOC (up to -3% yr^{-1}) is observed over some regions of the continents of North America, Europe and South America. Over the Oceanic regions including the Pacific, North Atlantic and Indian Oceans, significant decreases in TOC (-1 to - 3% yr^{-1}) were observed. In addition, the response of El Niño-Southern Oscillation and quasi-biennial oscillation to changes in TOC for the period 2003–2011 was investigated. The result shows extensive regions, mostly in the tropics and Northern Hemisphere extratropics, of significant ENSO responses to changes in TOC and significant QBO response to TOC changes over some regions.