



Measurement of OH and HO₂ in coastal Antarctica using Laser Induced Fluorescence

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Measurements of boundary layer OH and HO₂ radical concentrations at Halley Base, Antarctica were conducted over an 8-week period during January and February 2005 (austral summer), as part of the CHABLIS (Chemistry of the Antarctic Boundary Layer and the Influence of Snow) project involving the British Antarctic Survey and the Universities of Leeds, York, East Anglia, Bristol and Imperial College. The HO_x measurements were performed by laser-induced fluorescence, using the FAGE technique, with HO₂ detected as OH following its chemical conversion by reaction with NO. The system was calibrated using the water photolysis / ozone actinometry approach. During the CHABLIS campaign, simultaneous measurements including NO_x, VOCs, peroxy radicals, peroxides, HONO and HCHO, halogens and meteorological / radiation data were also performed, permitting a detailed comparison of measured and simulated radical activity, and estimation of the influence of snowpack emissions upon oxidant levels. OH and HO₂ data were acquired on 37 days, including a near-complete 5-week time-series. The campaign average OH and HO₂ levels were $3.9 \times 10^5 \text{ cm}^{-3}$ and 0.76 pptv respectively, with hourly mean levels over local solar noon of $7.9 \times 10^5 \text{ cm}^{-3}$ and 1.9 pptv respectively. Analysis using a simple steady state approach shows that these levels are significantly higher than those which would be expected for a pristine environment such as Halley in the absence of local snowpack (e.g. NO_x) sources