Newly Identified Region of Rapid, High Concentration Wintertime Ozone Production

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Schnell et al. Nature Geosci. 2, 120-122 (2009) showed that high concentrations of wintertime photochemical ozone were produced rapidly at temperatures as cold as -18C in the rural Upper Green River Basin, Wyoming, USA. Here we note the identification of a ~15,000 km^2 region of high concentration and persistent wintertime ozone production in the Uinta Basin, Utah in the winter of 2009-2010 (40° N, 110° W; 300 km E-W x 200 N-S; basin floor ~1400 m above sea level). The Uinta Basin is ringed by mountain ridges of 1800-3300 m elevation and contains oil and gas extraction activities.

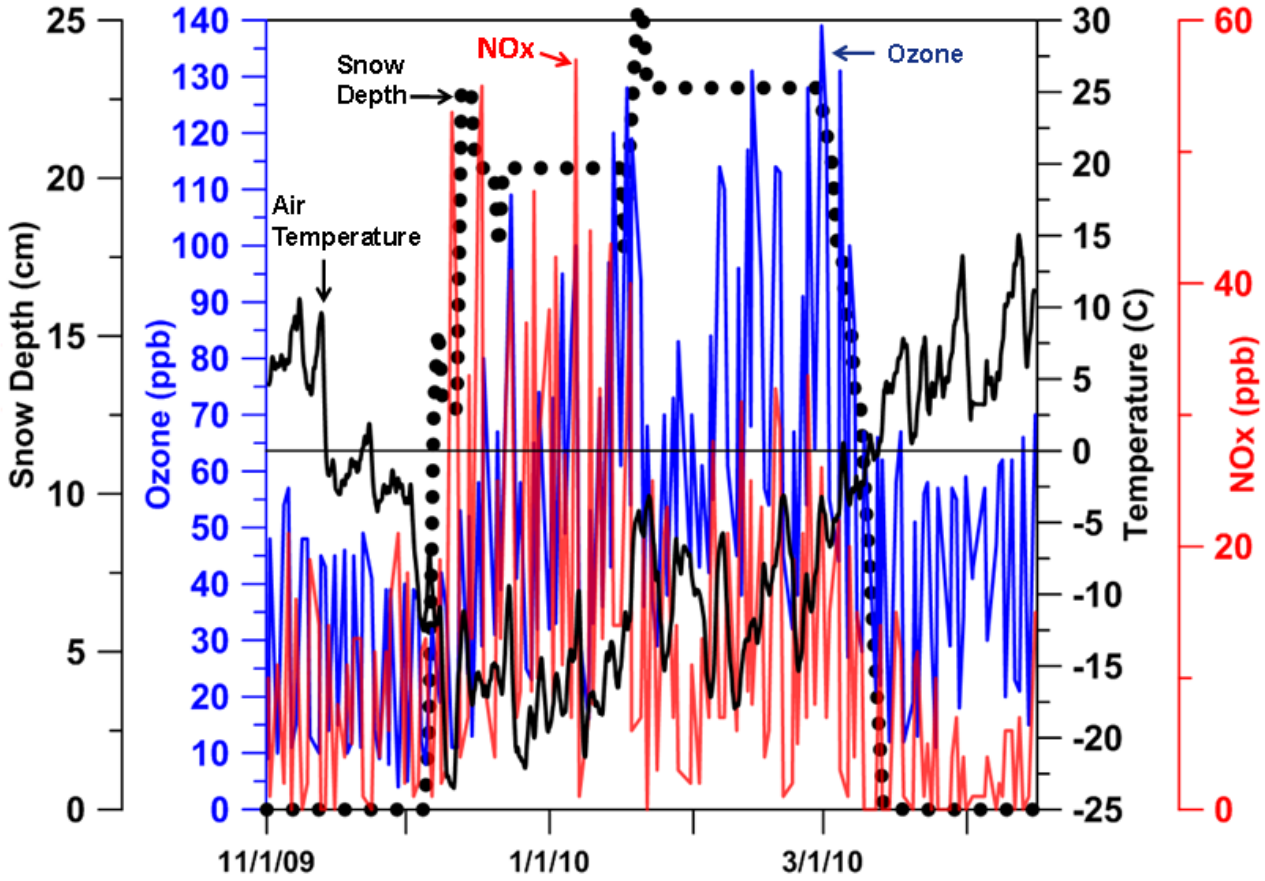

Figure 1. Hourly average max/min ozone and NO_x, average daily air temperature and snow depth for the Ouray, Utah monitoring station, 1 November, 2009 – 15 April, 2010. Through the summer and fall, ozone concentrations were at typical rural background levels of 20-50 ppb rapidly increasing to 60-120 ppb in mid-December, 2009 following sustained snow cover and abruptly decreasing from 115 ppb to 50 ppb the day snow melted and remaining in the 30-50 ppb range into summer. NO_x concentrations were in the 2-10 ppb range prior to snow cover after which they rose to the 20-50 ppb range for the first half of the winter then decreased to the 10-30 ppb range until snowmelt, after which they returned abruptly to the 2-10 ppb range.