Title:	Constraints on instantaneous ozone production rates and regimes during DOMINO derived using in-situ OH reactivity measurements
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Abstract:	In this study air masses are characterized in terms of their total OH reactivity which is a robust measure of the "reactive air pollutant loading". The measurements were performed during the DOMINO campaign (Diel Oxidant Mechanisms In relation to Nitrogen Oxides) held from 21/11/2008 to 08/12/2008 at the Atmospheric Sounding Station-El Arenosillo (37.1° N-6.7° W, 40 m a.s.l.). The site was frequently impacted by marine air masses (arriving at the site from the southerly sector) and air masses from the cities of Huelva (located NW of the site), Seville and Madrid (located NNE of the site). OH reactivity values showed strong wind sector dependence. North eastern "continental" air masses were characterized by the highest OH reactivities (average: 31.4 ± 4.5 s -1 range of average diel values: 21.3-40.5 s -1), followed by north western "industrial" air masses (average: 13.8 ± 4.4 s -1; range of average diel values: 7-23.4 s -1) and marine air masses (average: 6.3 ± 6.6 s -1; range of average diel values: below detection limit g-21.7 s -1), respectively. The average OH reactivity for the entire campaign period was ∼18 s -1 and no pronounced variation was discernible in the diel profiles with the exception of relatively high values from 09:00 to 11:00 UTC on occasions when air masses arrived from the north western and southern wind sectors. The measured OH reactivity was used to constrain both diel instantaneous ozone production potential rates and regimes. Gross ozone production rates at the site were generally limited by the availability of NOx with peak values of around 20 ppbV O3 h -1. Using the OH reactivity based approach, derived ozone production rates indicate that if NO x would no longer be the limiting factor in air masses arriving from the continental north eastern sector, peak ozone production rates could double. We suggest that the new combined approach of in-situ fast measurements of OH reactivity, nitrogen oxides and peroxy radicals for constraining instantaneous ozone production rates, could significantly improve analyses of upwind point sources and their impact on regional ozone levels
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