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The summertime Boreal forest field measurement intensive (HUMPPA-COPEC-2010): an overview of meteorological and chemical influences.

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This submission describes the background, instrumentation, goals, and the regional influences on the HUMPPA-COPEC intensive field measurement campaign, conducted at the Boreal forest research station SMEAR II (Station for Measuring Ecosystem-Atmosphere Relation) in Hyytiälä, Finland from 12th July-12th August 2010. The prevailing meteorological conditions during the campaign are examined and contrasted with those of the past six years. Back trajectory analyses show that meteorological conditions at the site in 2010 were characterized by a higher proportion of southerly flow than in the other years studied. As a result the summer of 2010 was anomalously warm and high in ozone making the campaign relevant for the analysis of possible future climates. A comprehensive land use analysis, provided on both 5 and 50 km scales, shows that the main vegetation types surrounding the site on both the regional and local scales are: coniferous forest (Scots pine and/or Norway spruce); mixed forest (Birch and conifers); and woodland scrub (e.g. Willows, Aspen); indicating that the campaign results can be taken as representative of the Boreal forest ecosystem. In addition to the influence of biogenic emissions, the measurement site was occasionally impacted by sources other than vegetation. Specific tracers have been used here to identify the time periods when such sources have impacted the site namely: biomass burning (acetonitrile and CO), urban anthropogenic pollution (pentane and SO_2) and the nearby Korkeakoski sawmill (enantiomeric ratio of chiral monoterpenes). None of these sources dominated the study period, allowing the Boreal forest summertime emissions to be assessed and contrasted with various other source signatures.