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# Identity, origin and evolution of polar organic compounds in fine aerosols in the Southeastern United States

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Filter samples of fine aerosols collected in the Southeastern United States in June 2004 were analyzed for the characterization of polar organic components. Four analytical techniques – liquid chromatography - mass spectrometry, ion trap mass spectrometry, laser desorption ionization mass spectrometry, and high-resolution mass spectrometry – were used for identification and quantification. Forty distinct species were detected, comprising on average 7.2% of the total particulate organic mass at three inland sites. Chemical and correlation analyses strongly suggest that the detected species are secondary in nature and originate from terpene oxidation, with possible participation of $NO_x$ and $SO_2$. It is estimated that polar, acidic components in fine aerosols in the Southeastern US cover a molecular weight range (MW) of 150 – 400 Da and they do not appear to be oligomeric in chemical nature. Other components with MW up to 800 Da may also be present. The detected polar organic species are similar to humic-like substances (HULIS) commonly found in fine aerosols in other rural areas. We present direct evidence that atmospheric processing of biogenic emissions can lead to the formation of certain HULIS species in fine aerosols, and that this may be a typical pathway in the background atmosphere in continental regions.