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Aerosol Integrated Analysis in Central West Antarctica:Brazilian Standalone Unit

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Changes in Antarctica ice sheets and ice shelves are of primary concern to the regional and global climate. We hypothesize that the West Antarctic warming can be related to the aerosols transported and/or formed in this region. Rather than being inert, snow is highly active, with snowpack impurities being photolysed to release reactive trace gasses such as OH, NO/NO_2 and O_3 into the troposphere. The impact of solar radiation, enhanced by O_3 depletion, creates the optimal conditions for heterogeneous gas-to-particle reaction, modifying the chemical and physical properties of aerosols substantially. This study shows evidence of atmospheric processing, via microscopic and molecular speciation of individual aerosol by Scanning Transmission X-ray microscopy with near edge X-ray absorption fine structure spectroscopy (STXM/NEXAFS). Specifically, STXM reveals an accurate fraction of internally mixed particles with NaCl cores and nitrate coatings. The scattering efficiency of sea salt particles may decrease as a consequence of the external nitrate covering since the hygroscopicity of a mixed nitrate-salt particle is weak. The unique signal of ClO-type-molecules could be possibly associated with OH radical oxidation products of NaCl particles. Considering the perchlorate has a supercooling property, it is possible to assume that perchlorate could produce a small melting effect especially at ablation zones of Antarctic glacier experiencing severe mass loss due to warming.