The effects of organics properties on aerosol indirect effects

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Atmospheric aerosols influence the global energy budget by scattering and absorbing sunlight (direct effect) and by changing the microphysical structure, lifetime, and coverage of clouds (indirect effects). Currently, aerosol indirect effects represent the largest uncertainties in anthropogenic radiative forcing derived from global model simulations. These large uncertainties are in part due to crude representations of aerosol properties and the subsequent treatments of cloud activation in global models.

The ability of an aerosol particle to form cloud droplet depends on its size and chemical composition, and can be effectively described by Köhler theory. For aerosols containing typical inorganic species, their cloud-activation properties are relatively well understood and can be effectively represented in models. However, atmospheric aerosols often consist of hundreds of organic species, which can contribute upward of ~70% of total fine aerosol mass. These organic species cannot be individually simulated in global models due to computational constraints. Furthermore, thermodynamic properties of many organic species observed in ambient aerosols are often not available for predicting their cloud-activation behavior using Köhler theory. As a result, organics are often represented as a single (or a few) species with fixed properties in global models.

The influences of aerosol organics properties on predicted cloud condensation nuclei (CCN) concentrations and aerosol indirect effects are examined using field measurements of representative aerosol types. Preliminary results show that for aerosol particles containing more than ~40% inorganic species by volume, such as typical marine aerosols and rural aerosols, the predicted CCN concentrations and aerosol indirect effects are insensitive to the properties of the organics, and can be effectively predicted assuming a constant hygroscopicity for all organic species. The implications of this finding on future aerosol CCN studies and the representation of the effects of organic aerosols on cloud-activation in global models are discussed.

Tectono-geochemistry anomaly horizontal zoning features of 59[#] orebody in the Yimen Fengshan Copper Deposit, Yunnan, China

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The Yimen Fengshan copper deposit is a typical example of the Yimen-type copper deposit which is located in the copper mineralization zone of the Kunyang rift valley, Yunnan Province, China [1]. This deposit is evidently controlled by diapiric structure, and ore bodies are mainly located in the cataclastic dolomite of Lvzhijiang formation, Kunyang group, middle proterozoic.

Based on study on deposit geological characteristics and the disciplinarian of tectonic ore-controlling, the autors have gotten six factors and summed up the tectono-goechemisitry features by doing R-factor analysis with the geochemical sample data of 59[#]ore body and its adjoining rock. The mineralization associations of elements Zn-Cd-Ag-Tl-Bi-Cu-Mo, Cu-Bi and Na_2O-Pb anomaly which located in the same position with 59[#] ore body, appear at the marginal of diapiric structure; Na_2O-Pb anomaly orthoaxis direction and ore body strike line are accordance; CaO-MgO-Sr is the elements association of alteration dolomite, its negative anomaly appears at the adjoining rock. The tectono-goechemisitry feature reflects that the indicator elements is Cu-Bi→Zn-Cd-Ag-Tl-Bi-Cu-Mo and Na_2O-Pb→CaO-MgO-Sr (adjoining rock) horizontal zoning from the center of the ore body to the adjoining rock. The disciplinarian plays an important role in the depth ore-finding prognosis.

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