Aerosol influence on decadal changes in precipitation and snow cover over Asia

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We examine decadal changes (1990 to 2010) in climate over India due to aerosol emissions using the NASA Goddard Institute for Space Studies climate model. We include all aerosols effects (direct, semi-direct and aerosol-cloud effects) as well as changes to snow/ice albedo from black carbon (BC) deposition. We use two different BC emission inventories that differ considerably in their BC burden from coal, transportation and biofuel sources over India. Over India, for the last decade snow/ice cover have decreased by 1% and the contribution of BC aerosols to this decline is ~ 30% using the higher BC emission inventory. Spatial changes in simulated snow/ice cover match observed trends for the 1990-2000 period. These changes are not only related to atmospheric heating from BC aerosols but also to changes to precipitation (and hence BC deposition) and cloud cover. Observed precipitation trends for the 1990-2000 period indicate a decline in central India similar to simulated trends with the higher BC emissions. However observed trends over east India from two sets of observations were opposite and not conclusive. The range in climate impacts from the two emission inventories used provides an estimate of the expected uncertainty in climate change for the last decade and illustrates future expected challenges.

A new Lower Cretaceous fossil resin from El Soplao, Cantabria (Spain): Biomarkers and chemotaxonomy

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Intensive geological survey in the El Soplao territory (northwestern Cantabria, Spain) recently resulted in the discovery of a new deposit of amber near the Zn-Pb deposit of La Florida. The amber pieces are present at many horizons within a unit of Lower Albian coastal to shallow marine siliciclastics, and are associated with abundant, very-well preserved plant cuticle compressions, specially of the extinct conifer *Frenelopsis* (Cheirolepidiaceae) [1].

To date, the biomarkers of *Frenelopsis* have never been examined [2]. The family Cheirolepidiaceae is related morphologically with modern Cupressaceae, but apparently are filogenetically unrelated [3]. To investigate potential relationship between amber and fossil conifer tissue at molecular level, amber and *Frenelopsis* leaves were analyzed.

The organic extract of amber was fraccionated by flash chromatography and analyzed by GC-MS. The biomarker content shows the presence of conserved bioterpenoids of the phenolic abietane class (ferruginol, norferruginol, sugiol), traces of totarane type terpenoids (totarol), pimaric acid and labdane derivatives (agathic acid, sclarene). The lack of abietic and dehydroabietic acids discard the Pinaceae contribution to the amber [4,5]. Some terpenoids with unclear structure were isolated, as well as azulene derivatives. Despite of the poorer conservation of terpenoids in the fossil leaves, some compounds are shared, particularly the unknown terpenes and azulene derivatives (guaiazulene, camazulene and trimethylazulene). The presence of these hydrocarbons could be the cause of the bluish tingue of the amber of El Soplao. Our results suggest a *Frenelopsis* origin for the amber and a chemosystematic relationship between *Frenelopsis* and modern Cupressaceae.

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