

Dust Indicators and Records of Terrestrial and Marine Paleoenvironments

Mineral dust aerosols play an important role in the global climate system, by mediating physical and biogeochemical exchanges among the atmosphere, land and ocean. Atmospheric dust can have a profound effect on the earth system by affecting the radiative forcing of the atmosphere, through chemical reactions with other atmospheric constituents, and through its impact as a source of micronutrients to marine and terrestrial ecosystems. As the net effect of these processes is still unknown, climate modeling studies are underway to assess the overall magnitude and direction of the forcing effect of dust on the current climate.

Records of dust from ice cores, marine sediments and loess deposits clearly demonstrate that throughout the Quaternary, glacial periods were considerably dustier than interglacial periods. The high concentrations of atmospheric dust during the last glacial period make it an excellent test of our ability to model the fluxes, concentrations, and interactive effects of dust in the atmosphere. Observational datasets are crucial for verifying that the simulated magnitudes and distribution of dust resemble reality. Validation datasets help to quantify changes in potential dust source areas (e.g. using maps of vegetation and loess accumulation), as well as identifying the magnitude and extent of dust during past climate periods.

A preliminary attempt to compile dust fluxes from ice cores and marine sediments for the Last Glacial Maximum was initiated as part of the Mineral Aerosols on Glacial-Interglacial Cycles (MAGIC) project (Figure 1 in 'Loessfest' workshop report, facing page), for comparison with model simulations of the dust cycle for the last glacial and current climates. There is a need to improve this dataset and extend it to also include terrestrial data from the last 30,000 years, in order to document the complete glacial, deglacial, interglacial sequence. In addition to eolian fluxes, this database should contain the background data necessary to interpret the flux information, as well as additional metadata. In addition to its utility for model validation, this database could provide a useful repository of dust data, serving a variety of purposes for earth scientists.

The Dust Indicators and Records from Terrestrial and Marine Paleoenvironments (DIRTMAP) database has been established to serve both the earth science and modeling communities. This initiative was recently named a highest priority item for the IGBP/GAIM Paleo Trace Gas and Mineral Aerosol Challenge (TRACES), endorsed by IGBP/PAGES Paleo Mapping Project (PMAP), and by International Geological Correlation Programme (IGCP) #413. It has been recognized as an important formal activity of the INQUA Loess Commission, over the next two inter-Congress periods (1999–2007). We are enlisting the help of the international community to produce this new database. As "Phase 1" of the data collection activities, we have established an interactive web form, through which members of the loess community can contribute information about their field sites to a global inventory of analyzed loess deposits (see the "Fink Link" at http://www.bgc-jena.mpg.de/bgc_prentice/start1.html).

As "Phase 2," the DIRTMAP database will target data from 0 to 30,000 years BP, containing sediment age models and accumulation rates, bulk densities, mineralogical and provenance tracer data, grain size information, and chronological data (e.g. radiocarbon dates, luminescence dates, stratigraphic correlations, etc.). Any data included in the database will have the additional documentation that is required for interpretation. DIRTMAP is intended to be a public access database. Participants will have access to the data during the developmental phase. Scientists interested in contributing to this effort or in obtaining more information can contact Karen Kohfeld, the DIRTMAP Database coordinator, at the address below.

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WORKSHOP REPORTS

Loessfest'99

BONN, GERMANY 26 MARCH – 1 APRIL 1999

"Loessfest'99", the INQUA/IGCP Spring Dust Festival was an international conference sub-titled "loess: characterization, stratigraphy, climate and societal significance". The initiative for this meeting came jointly from IGCP Project #413 on 'Understanding Future Dryland Changes from Past Dynamics' and the Loess Commission of INQUA. Its aims were to review the current state and future directions of loess research. "Loessfest'99" marked both the 175th anniversary of the first description of the Rhineland loess at the *locus classicus et typicus* at Haarlass, near Heidelberg by Karl Caesar von Leonhard, and the 30th anniversary of the INQUA Loess Commission. It came just five years after the 'stock-taking' meeting on *Wind-blown Sediments in the Quaternary Record* held in Royal Holloway (University of London, UK) under the aegis of both IGCP and INQUA, and the NATO sponsored gathering in Loughborough UK on *Genesis and Properties of Collapsible Soils*.

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In Bonn, a total of 88 papers by just under 100 participants were presented as keynote reviews, oral presentations and poster papers, and included a special evening lecture by W. von Koenigswald on *Climatic changes recorded by the Quaternary fauna in the Rhine area*. Scientists came from 16 countries on five continents.

Appropriately enough, Loessfest'99 began with keynote reviews on, first,