Fungi count

Proc. Natl Acad. Sci. USA **106,** 12814–12819 (2009)

Atmospheric particles contain high numbers of fungal species, according to a genetic analysis. Fungal spores constitute a large proportion of atmospheric particles, but until now the diversity of these spores has remained uncertain.

Viviane Despres, of the Max Planck Institute for Chemistry, Germany, and colleagues analysed the DNA of fungal spores in air samples collected from central Europe. There were over 1,000 fungal species in the air samples investigated, which were taken over the course of one year. Furthermore, the abundance of different fungal groups reflected the relative abundances of fungi in the biosphere. The abundance of these groups varied throughout the year, and between coarse and fine particulate matter. Spores harmful to plants were mainly found in larger particles, whereas those more harmful to humans were predominant in the finer fractions.

The researchers suggest that there is a need to monitor fungal spores more closely to understand how climate influences the abundance and diversity of fungi on local, regional and global scales.

Precipitation push

Paleoceanography
doi:10.1029/2009PA001778 (2009)

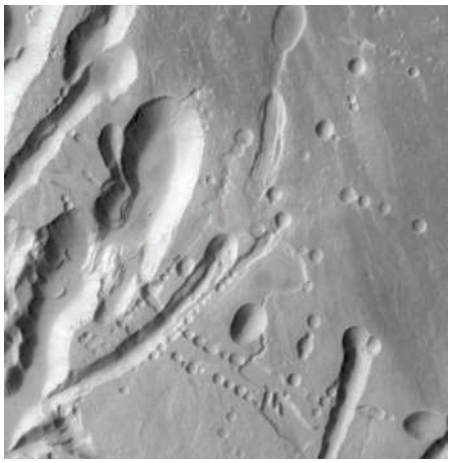
The Younger Dryas cooling, which punctuated the transition from glacial to interglacial conditions about 12,000 years ago, is usually attributed to glacial meltwater pouring into the North Atlantic Ocean. Model simulations show that instead, rising precipitation may be to blame.

The Younger Dryas event probably occurred when the surface of the North Atlantic Ocean rapidly freshened, slowing down overturning circulation and cooling much of the Northern Hemisphere. Ian Eisenman of the California Institute of Technology and colleagues simulated the effects of a melting North American ice sheet on atmospheric circulation using a general circulation model. Their simulation suggested that the jet stream would shift northward in response to the changing ice configuration, bringing more rain to the North Atlantic. This rain would have freshened the ocean surface enough to slow the overturning circulation.

The resultant cooling simulated by the model agrees with proxy reconstructions from the Northern Hemisphere, leading the authors to conclude that higher precipitation is a viable trigger for the Younger Dryas cooling.

A role for mud

Earth Planet. Sci. Lett.
doi:10.1016/j.epsl.2009.06.020 (2009)



A network of gullies and pits fringes the massive Ascraeus Mons volcano on Mars. A mapping effort suggests that the features were carved by liquid water that escaped from beneath the volcano.

John Murray of the Open University, UK, and colleagues used numerical models and high-resolution images of the martian surface to identify the origin of the gullies — known as sinuous rilles — on the volcano. The results imply that the rilles were eroded by liquid water. According to the team, the water probably originated in the volcano's ice-rich substrate, which was melted by the heat of the eruptions. The water then emerged on the martian surface at the periphery of the volcano, where it was channelled by fractures that had opened because of the sheer weight of the edifice.

The volcano is surrounded by an apron of material that has been interpreted as lava flows. The researchers suggest that the formation may instead be a remnant of extensive mud flows triggered by the escaping water.

Finding faults

Geomorphology **110,** 11–19 (2009)

The concentration of an isotope of radon, ^{222}Rn, in natural spring waters could be used to locate faults that have the potential to become active, according to geochemical analyses. The cracking and fracturing of rock associated with fault activity can release this radioactive gas into circulating groundwater.

Alberto Gonzaléz-Diéz of the University of Cantabria, Spain and colleagues sampled several springs from the Cantabria region and analysed the water for its ^{222}Rn concentration. Their selection of springs was designed to minimize any effects of temperature and precipitation, and to cover a wide variety of rock types, which can have varying levels of the elements that decay to radon. They found a much higher concentration of ^{222}Rn in the waters from springs that were close to known faults than in springs from undisturbed settings.

If this finding is applicable to other regions, maps of radon concentrations could be used to detect potentially active faults and identify possible natural hazards.

Spreading and sea level

Geology **37,** 687–690 (2009)

Sea level during the middle to late Cretaceous period (about 120 to 70 million years ago) is thought to have been on the order of 200 m higher than today. A new modelling effort suggests that the high seas were caused by the effects of the rapid creation of new oceanic crust and hence a younger average age of the ocean floor.

Maria Seton of the University of Sydney, Australia and colleagues simulated the configuration of ocean basins over the past 140 million years. They found that new oceanic crust was produced at a much higher rate during the Cretaceous, compared with the present day. Consequently, the average age of the sea floor was much younger. Young oceanic lithosphere is less dense than the older lithosphere, which reduces the relative volume of the ocean basins. As a result sea water was pushed up onto the continents.

Once the pulse of new seafloor creation ended, the oceanic lithosphere cooled and subsided relative to the continents. The ocean basins could then accommodate more water, leading to a fall in the sea level.