

What can we learn from deep ice cores?

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Polar ice sheets and glaciers contain well-ordered archives of ancient ice that fell as snow, from recently to millions of years ago. The ice composition and impurities, along with the gasses entrapped in air bubbles together provide a unique history of past climate changes and environmental and atmospheric composition. The study of deep ice cores revealed the close link between temperature and atmospheric CO₂ over the last 700,000 years, pointing out those climate issues caused by increasing anthropogenic emissions of greenhouse gasses. Also, the role of the Atlantic Ocean in distributing heat between the Northern and Southern Hemispheres is now documented by a so-called see-saw phenomenon that occurred at millennial scale during the last glacial period.

Aerosols emitted from continents (dust), from volcanoes (sulfur and glass shards), and from the ocean (sea salts) are measured in ice, and are used to document atmospheric circulation and environmental changes through time. Of interest is ¹⁰Be, which is formed by the interaction of cosmic rays with the atmosphere, and its potential for reconstruction of solar activity and documenting short-term variability of the atmospheric circulation.

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