



Tracing the CO₂ system with boron isotopes

James W.B. Rae

University of St Andrews, Department of Earth and Environmental Sciences, St Andrews, UK

Many of the major shifts in earth's surface environment are thought to be associated with changes in CO₂. However reconstructing different components of the ocean-atmosphere CO₂ system has proved challenging. Here I describe the use of boron isotopes in marine carbonates as a tracer of the carbonate system. This field has expanded rapidly in recent years, spurred-on by analytical developments and extensive calibration work. Applications of this technique now include reconstructing atmospheric CO₂ beyond the reach of the ice cores, tracing carbon storage in the deep ocean over glacial-interglacial cycles, and probing the processes by which calcifiers make their skeletons. I will discuss the strengths and weaknesses of the boron isotope method, its use in multi-proxy studies, and present new data highlighting the processes of CO₂ release from the deep Southern Ocean at the end of the last ice age.