# Breaking the tradition: Pushing the boundaries of the Sr isotope systems

CHRISTOPHER R. PEARCE[1]

[1]National Oceanography Centre, University of Southampton Waterfront Campus, Southampton, SO14 3ZH, UK
c.r.pearce@noc.ac.uk

Over the last half century the radiogenic strontium isotope system ($^{87}Sr/^{86}Sr$) has become established as the go-to proxy for constraining changes in continental input to the oceans over geological timescales. The peaks and troughs of the Phanerozoic seawater $^{87}Sr/^{86}Sr$ record have frequently been used to quantify variations in chemical weathering and volcanic activity, though the long residence time of Sr in seawater and analytical precision have traditionally limited the focus of these studies to long-term (>1 Ma) climatic perturbations [1].

In this talk I will discuss how continuing improvements in our technical and analytical capabilities are revealing a much more dynamic marine $^{87}Sr/^{86}Sr$ record that is sensitive to transient variations in continental weathering on <100 kyr intervals [2]. I will show how the application of high-precision $^{87}Sr/^{86}Sr$ analyses to key climatic intervals is reshaping our knowledge of the changes in the seawater Sr curve, and improving our understanding of the rate of silicate-weathering feedback and its role in regulating global climate.

I will also consider how the development of the ‘non-traditional’ stable Sr isotope system ($\delta^{88}Sr$) over the last decade has enhanced our ability to constrain the marine strontium cycle and the processes that govern Sr exchange during fluid-rock interaction [e.g. 3,4]. Particular emphasis will be placed on how the combined use of the $\delta^{88}Sr$ and $^{87}Sr/^{86}Sr$ systems can be used to characterise the extent of chemical weathering and the formation of secondary phases, and their potential to help resolve the impact that these processes have on atmospheric $CO_2$.

[1] McArthur *et al.*, in *The Geological Time Scale 2012*, Gradstein *et al*. (Eds), v1, p127-144.
[2] Mokadem *et al*. (2015). EPSL, v300, p359-366.
[3] Pearce *et al*. (2015). GCA, v157, p125-146.
[4] Andrews *et al*. (2016). GCA, v173, p284-303.