New insights after a good long sniff of the "whiff"

CHADLIN M. OSTRANDER (CMOSTRAN@ASU.EDU)[1] AND ARIEL D. ANBAR[1,2]

[1]School of Earth and Space Exploration, Arizona State University, Tempe, AZ, USA
[2]School of Molecular Sciences, Arizona State University, Tempe, AZ, USA

Just over a decade ago, geochemical evidence was first presented for a "whiff" of atmospheric O_2 2.5 billion years ago (Ga) [1, 2]. In the years that followed, a litany of additional evidence emerged that not only corroborated this finding, but also expanded its impact into Earth's early ocean [3 - 8]. Finally, and most recently, it was suggested that O_2 accumulation in the ocean at 2.5 Ga was much more substantial than previously recognized, extending into marine bottom waters and sediments over large areas of continental margins [9].

In this presentation, we will summarize the current state of knowledge for the oxygenation event at 2.5 Ga. Topics we will discuss include (but may not be limited to): Where did O_2 production occur? Where and to what extent did O_2 accumulation take place? What connections can be made between the 2.5 Ga "whiff" and the Great Oxidation Event? Finally, does evidence exist for similar oxygenation episodes at other times during the Neoarchean (2.8 Ga to 2.5 Ga)?

References: [1] Anbar et al. (2007) *Science* 317, 1903-1906, [2] Kaufman et al. (2007) *Science* 317, 1900-1903, [3] Garvin et al. (2009) *Science* 323, 1045-1048, [4] Reinhard et al. (2009) *Science* 326, 713-716, [5] Duan et al. (2010) *Geochim. Cosmochim. Acta* 74, 6655-6668, [6] Kendall et al. (2013) *Chem. Geol.* 362, 105-114. [7] Kendall et al. (2015) *Science Advances* 1, e1500777, [8] Stüeken et al. (2015) *Geology* 43, 259-262, [9] Ostrander et al. (2019) *Nat. Geosci.* 12, 186-191.