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# Termination of the Great Oxidation and Lomagundi-Jatuli events by degassing during emplacement of layered intrusions and sills

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The Great Oxidation Event (GOE) was a profound turning point in Earth's history and represents the first significant buildup in Earth's atmospheric oxygen[1]. It was followed by Earth's largest magnitude known positive excursion of $\delta^{13}C$ in marine carbonates, termed Lomagundi-Jatuli event (LJE) from 2.22 to 2.06 Ga[2]. Final termination of the GOE and LJE occurred contemporaneously at around 2058±2 Ma during end of the Rhyacian period[3]. Although progresses have been made during last two decades, mechanisms responsible for the GOE and LJE remain highly debated[4,5] and little is known on the causes for termination of the events at end of the Rhyacian period.

The LJE occurred during the Rhyacian period (2.30-2.05 Ga), which is characterizied by development of large layered intrusions and sills in many cratons[6] and lack of orogenic or other significant tectonic events. Termination of the GOE and LJE at ca. 2.06 Ma was nearly synchronous with intrusion of one of the world's largest igneous provinces (LIPs), the Bushveld Igneous Complex in southern Africa[7], which suggests a link between the end of the LJE and Bushveld LIP and coeval magmatic events in other cratons [8].

Our prelimintary results on the ca. 2.06 Ga mafic sills emplaced into the Paleoproterozoic carbonaceous-rich shales and limestone in the North China Craton and integrated with global geochronolal data on Rhyacian layered intrusions and sills show that intrusion of these layered intrusions and sills into carbonaceous-rich shales and limestone may have released large amounts of $^{12}C$-enriched carbon gases into the atmosphere and resulted final termianation and return of the positive carbon-isotope excursions to normal in marine carbonates at ca. 2.06 Ga.

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