

## **An early Neoproterozoic banded iron formation in China**

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Banded iron formations during ca. 1.8Ga to ca. 0.7Ga, namely as “boring billion”, have been rarely reported. Here we confirm that the Shilu iron ore deposit on Hainan Island, China, is an early Neoproterozoic iron formation. The deposit is large-scale, which contains >460 Mt of Fe ore reserves and formed during the early Neoproterozoic (1.0–0.8 Ga), although its precise age requires further studies. The evidence supporting the iron-formation origin for this deposit include: 1) variable but strongly positive Fe isotopic compositions ( $-0.29\text{‰}$  to  $1.62\text{‰}$  for  $\delta^{56}\text{Fe}_{\text{IRMM-014}}$ ) for Fe ores, 2) occurrence of alternating Si-rich and Fe-rich bands at millimetre to centimetre scales, 3) widespread fine-grained jasper in Fe ores, and 4) elevated concentrations of Fe and Si for whole-rock compositions, and PAAS-normalised REE patterns similar to the compositions of chemical sediments. Moreover, the Shilu iron formation of Hainan Island likely correlates with the Aok iron formations in Canada and they likely represent an early Neoproterozoic iron-formation depositional event related to tectono-hydrothermal activity. The presence of these early Neoproterozoic iron formations not only provides new records revealing the paleoenvironment during “boring billion”, but also provides new insights on the genesis of those Neoproterozoic iron formations during “Snowball Earth” event.