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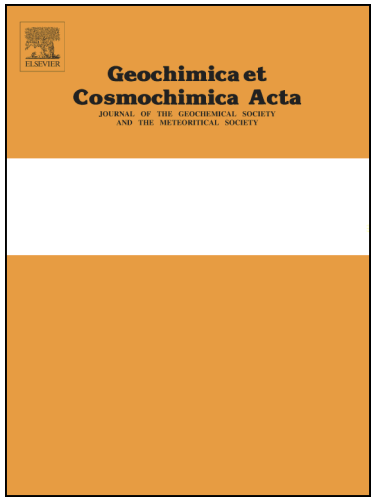

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PII: S0016-7037(16)30653-6
DOI: http://dx.doi.org/10.1016/j.gca.2016.10.050
Reference: GCA 10019

To appear in: *Geochimica et Cosmochimica Acta*

Received Date: 6 August 2015
Revised Date: 24 October 2016
Accepted Date: 30 October 2016

Please cite this article as: Koehler, M.C., Stüeken, E.E., Kipp, M.A., Buick, R., Knoll, A.H., Spatial and temporal trends in Precambrian nitrogen cycling: a Mesoproterozoic offshore nitrate minimum, *Geochimica et Cosmochimica Acta* (2016), doi: http://dx.doi.org/10.1016/j.gca.2016.10.050

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Spatial and temporal trends in Precambrian nitrogen cycling: a Mesoproterozoic offshore nitrate minimum

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Abstract

Fixed nitrogen is an essential nutrient for eukaryotes. As N_2 fixation and assimilation of nitrate are catalyzed by metalloenzymes, it has been hypothesized that in Mesoproterozoic oceans nitrate was limited in offshore environments by low trace metal concentrations and high rates of denitrification in anoxic and episodically euxinic deep water masses, restricting eukaryotes to near-shore environments and limiting their evolutionary innovation. To date this hypothesis has only been tested in the Belt Supergroup (~1.4 Ga), with results that support an onshore-offshore nitrate gradient as a potential control on eukaryote ecology. Here we present

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