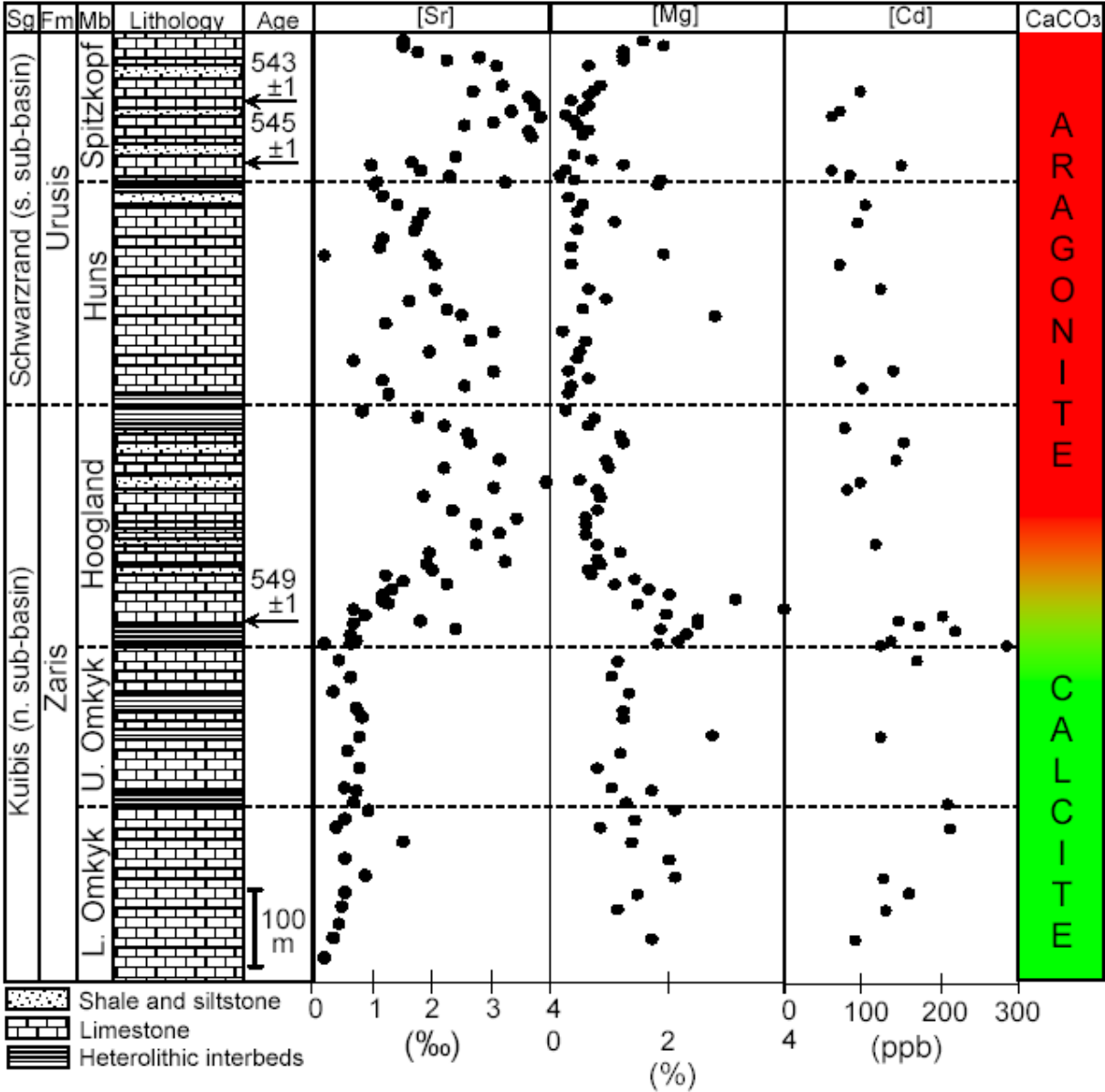


# GEOCHEMICAL AND PETROGRAPHIC INVESTIGATION OF A NOVEL CALCITE-ARAGONITE SEA TRANSITION IN TERMINAL PROTEROZOIC TIME (549 – 548 MA)

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Throughout geologic time, the oceans have oscillated between intervals favoring the deposition of the aragonite polymorph of CaCO<sub>3</sub> and the calcitic polymorph. The challenge to reconstructing these trends in carbonate mineralogy from the geologic record arises from the fact that metastable aragonite converts to low-Mg calcite over relatively rapid geological timescales. PI Ries is developing a suite of geochemical and petrographic indicators of original CaCO<sub>3</sub> polymorph mineralogy to enable such reconstructions. One such indicator is the elemental composition of limestones, as elements tend to be partitioned differently in aragonite than they are in calcite. If these compositional differences survive diagenesis, then they can serve as an indicator of primary mineralogy. The figure reveals threshold changes in the Sr-, Mg-, and Cd-composition of marine limestones throughout a 10 m.y. sequence of terminal Proterozoic marine limestones from the Nama Group of Namibia. These threshold changes in abundance of polymorph-sensitive elements are consistent with a transition from calcite-to-aragonite seas across this critical interval of geologic time.