

# Isotope geochemistry of metacarbonate rocks as tools for reconstructing supercontinents

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Geochemistry of sedimentary rocks is widely used for understanding the depositional environment and tectonic setting, including source rock composition and paleo-ocean signature. In particular, chemically deposited carbonate rocks are supposed to hold key information of extinct paleo-oceans, since they are directly precipitated from seawater. Trace and rare earth element compositions, carbon, oxygen, strontium and neodymium isotopes in carbonate rocks, can be useful in this respect, because each element have distinct source characteristics and residence and mixing time in seawater. In addition, many of the geochemical proxies in carbonate rocks are also controlled by the depositional environments, which can help in identifying the tectonic setting.

In the many of the East Gondwanan terranes, metasedimentary rocks are widely distributed, especially with thick sequences of metapelitic rocks intercalated with metacarbonate rocks. Although it is clear that the deposition of these rocks occurred in the “Mozambique Ocean” , it is still not clear when and where sedimentation has occurred. In order to reveal the relationship between paleo-ocean and paleo-continent, a comprehensive geochemical study on metacarbonate rocks was carried out. Based on the results obtained, it was possible to put forward a model to explain the differences in depositional setting in different terranes of East Gondwana. In this presentation, I will compile the information from Dronning Maud Land in East Antarctica, the Highland Complex in Sri Lanka, southern granulite terrain, in southern India and the Mozambique Belt.

Geochemical screening was first carried out for post-depositional alteration, using oxygen isotopes, trace elements and REE + Y patterns. Strontium isotope chemostratigraphy was applied to the metacarbonate rocks from all these terrains. A comparison of Sr and Nd isotopic characteristics of metacarbonate rocks with the basement rocks from neighboring cratons were also carried out.

The Sr and Nd isotopic compositions of carbonate rocks deposited in the Mozambique Ocean have preserved important information about depositional setting of sedimentary rocks and relationship with surrounding basement and continents. In summary, geochemical proxies such as Nd and Sr isotopes of metacarbonate rocks can yield key information not only of paleo-oceans but also about the surrounding continents during depositional timing, which can lead to a better understanding of accretion, oceanic closure and collision process during the formation of supercontinents.

Keywords: Metacarbonate rocks, Strontium isotopes, Chemostratigraphy