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# Peperite occurrence in Putteti Alkaline Igneous Suite, Kanyakumari District, Tamil Nadu, South India – What Geological Perceptions Does It Challenge?

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Petrography of in situ volcanic rocks may give important insights into the tectonic regime of the area, either directly, through the composition of magma and eruption mode reflected in petrography, or indirectly, via the landscape peculiarities documented by the petrography of the volcanics. One highly instructive case of the latter type is the evidence of magma-water interaction, which may also vary from pillow lavas typical for submarine environments to columnar jointing resulting, inter alia, from subglacial eruptions. A spectacular object was found in Kanyakumari District in Southern India near Putteti. Putteti syenite is a unique alkaline suite south of Achankovil Shear Zone in the Kerala Khondalite Belt. It has been believed to be a product of mingling and crystallization of silicic and mafic magmas. Both layered and massive varieties of the syenite were reported from the suite. Earlier workers determined the age of the syenite as Ordovician (?)/ Neoproterozoic (?) and substantiated its plutonic origin, suggesting it had crystallized at a depth of lower crustal levels (10-12 Kms).
However, recent field studies in the Kanyakumari district revealed the presence of peperite whose chemical and mineral composition as well as some structural peculiarities clearly indicate that it is comagmatic to the Putteti syenite. This evidences for the synchronism of magmatism and sedimentation in the region. Still, geotectonic interpretation of such volcano-intrusive association is not as straightforward as it could be for the syenite proper. The size and physiography of the peperite body imply a considerable, though likely shallow, marine basin. The structural framework of the region and, in particular, this paleoenvironmental feature allows various interpretations of the Ordovician tectonics of the study area, and the plate-tectonic one is only one and perhaps not the most plausible option. In general, the experience we gained at tectonic re-interpretation of the discussed rock association and reconstruction of the history of its emplacement area has clearly pointed to a need of a conceptual tool to constrain tectonic settings based on the volcanic evidence, which could allow a researcher to select from a wide range of theories, not only from the plate tectonics. It would be highly desirable if this tool be based on modern advances in knowledge engineering and knowledge representation. Moreover, at the present state of the global tectonic thought, we are not sure it is reasonable to struggle for a unite and integer tectonic theory for the whole planet. On the contrary, perhaps it may appear more efficient to test a wide range of hypotheses on as many objects as possible, reasonably constraining them by volcanic, structural, geophysical and other evidence, thus aiming to narrow the range but not to limit ourselves by a singular paradigm.