



## **Application of CCSEM to heavy mineral deposits: source of high-Ti ilmenite sand deposits of South Kerala beaches, SW India**

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The rich heavy-mineral deposits in beach sands around the town of Chavara in SW India are characterized by containing ilmenite with elevated  $\text{TiO}_2$  contents, often exceeding 60 wt. %. In order to determine the origin of these high-  $\text{TiO}_2$  ilmenite deposits, we have collected a series of beach sediment samples (22) from an app. 800 km long stretch of coastline from northern Kerala state to well within the Tamil Nadu state. A set of river sediments was also taken, roughly covering the areas inland from the beach samples. The heavy-minerals in all samples were analyzed by Computer Controlled Scanning Electron Microscopy (CCSEM), a technique novel for heavy mineral sand exploration. CCSEM provides both chemical analyses of individual grains as well as the modal composition of heavy-minerals in sediments. The data shows that the sediments in the Chavara high-Ti ilmenite deposit is distinct by minor elements in ilmenite, garnet chemistry and heavy mineral assemblage: ilmenite has high MgO and low MnO contents; garnets have low grossular components and heavy-mineral assemblage is dominated by sillimanite-kyanite in addition to ilmenite. These features correlate with basement geology in the hinterland, and with sediments from rivers, draining the basement. Based on these observations we conclude that high-Ti ilmenite from Chavara beaches originates in the khondalite belt of high-grade meta-sediments. Our study demonstrates rapid mineral analyses in sediments by CCSEM to be efficient in the characterization of mineral compositions and assemblages in sediments, in the identification of possible source regions and thus ultimately in exploration for industrial mineral resources.