



Insights of burial and erosion signature from an ancient forearc basin: Taiwan Coastal Range

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Taiwan is located in the collision boundary between Philippine Sea Plate and Eurasian Plate. Taiwan orogeny eroded sediment away and then transported to adjacent basins. The eroded materials contain not only detrital from inorganic rocks but also organic matters. After sediment being deposited in basin, organic matters prone to bio-degradation and coalification through burial time, and thus preserve the basin burial history. In addition, transformation of clay mineral is another technique to observe basin burial history. Although there are many thermal burial history studies in western Taiwan because of the evaluation of petroleum potential, Coastal Range of eastern Taiwan is relatively less studied. So, it served as a candidate to examine the burial thermal history. This study collected sedimentary rocks and coalified woods from north to south with Shuilien, Fengpin, Chimei, Loho, Sanshien, and Madagida sections. Coalified woods and separated organic matters were collected from sedimentary rocks and made into pellets to measure their vitrinite reflectance (Ro%). Furthermore, Rock-Eval Pyrolysis was applied to acquire Tmax, a parameter for maturity evaluation. Additionally, X-ray diffraction (XRD) and Short wavelength infrared (SWIR) techniques were also used in this study. Ro% of Separated organic materials showed increase and highly disperse through younger upward part of the stratigraphic column. On the other hand, the coalified woods exhibited Ro% increased with depth in column. Combined with Rock-Eval Pyrolysis, Madagida section showed some S1 peak higher than S2 peak, and Tmax lower than 400° C in Sanshien section. The result indicates organic matters from Fanshuliao Formation of Loho and Madagida sections belonged to early mature stage, with gas prone organic matters (Type III, IV). The upward increase of Ro% implied inclusion of the reworked detritus organic materials. Furthermore, clay mineralogy such as SWIR from Shuilien and Madagida sections, exhibited D1900nm decreased through burial depth of selected stratigraphic columns. Finally, Raman Spectroscopy Carbonaceous Materials (RSCM) implied the northern part Coastal Range had received relatively higher metamorphic grade gravel sediments than southern part in 2Ma. However, Chimei section in the central part of Coastal Range had received gravel sediments with metamorphic grade up to green schist facies. Compared with the reworked vitrinite reflectance results, Ro constraint in 2-3.99% indicated six sections of Coastal Range received sediments with the Prehnite -Pumpellyite facies since 3.35Ma.