

General Theme 1

1.2

Biotic activities are involved in most, if not all, sedimentation processes from the ancient geological past to the present day. Biosedimentary records show that sedimentary system and ecosystem have undergone at least five major microbe-metazoan transitions (MMTs) from the Precambrian to present. The first MMT witnessed the rise of complex multicellular organisms in the microbial mat-dominated ecosystems in late Ediacaran. The longest MMT occurred in the Cambrian when the sea floors of shallow seas changed from matgrounds to highly bioturbated substrates. The other three MMTs are linked with major biotic extinction and environmental stresses, and occurred in the aftermaths of the Ordovician-Silurian (O-S), Frasnian-Famennian (F-F), and Permian-Triassic (P-Tr) mass extinctions. In addition, the extreme geochemical and biosedimentary signatures of depositional systems also characterize several major life and environmental turning periods, namely F-F boundary, Guadalupian-Lopingian (G-L) boundary, and mid-Jurassic and late Cretaceous AOEs. This session aims to advance global knowledge on biotic involvement in ancient sedimentation during critical life and environmental turning transitions, with an emphasis on organism-environment interactions for the evolution of Earth's life.