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Retrieving a Late Cretaceous Major Plate Reorganization Event of Pacific Ocean, Age 87-89 Ma (Late Turonian/ Coniacian): Insight from Eastern Asia and Significance to Pacific Evolution

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In Turonian /Coniacian time a major plate reorganization occurred in Pacific Ocean that resulted in synchronous climax of compression in both continental margins of the Pacific Ocean. At this time the spreading rate in the Farallon-Pacific-Izanagi center increased to its maximum, and the convergence angle experienced fast rotation. The maximum of Pacific stretching induced the coeval westward compression both along subduction boundaries and in intraplate environment of Eastern Asia. We reevaluate the age data of the main Late Cretaceous events in Eastern Asia caused by the Pacific dynamics. Increasing westward subduction and compression produced: (a) maximum of HP metamorphism in the Cretaceous accretion units of continental margin, (b) immense subduction related volcanic belts extending along the northeast Asian boundary, (c) vast volumes of granitoids which were emplaced everywhere from Chukotka in Russia to SE China. Thermochronological data suggest that (d) the Pacific-induced compression triggered uplift and exhumation of East China granites. Simultaneously, as thermal history results revealed, (e) burial heating in Cretaceous sedimentary basins inverted to cooling. This event is also documented by (f) the regional unconformities in the lacustrine basins. Thus the Pacific-induced deformation encompassed the whole eastern Asia. These contemporaneous Late Cretaceous oceanic and continental events had a common tectonic cause, evidently global in scale. Consequently, the large-magnitude compression regime probably involved in the Laramide Orogeny in the North American continent: (g) the fast stage of Farallon plate subduction in California reached its maximum at 88-84 Ma. Simultaneously, major compression-related events occurred: (h) the intra-arc ductile thrusting and rapid exhumation of the Sierra Nevada batholith at 96-86 Ma, (i) the cooling in the Idaho-Wyoming thrust belt during 90-80 Ma, (j) the major and very rapid subsidence of the Northern Green River and Central Utah foreland sedimentary basins at 90-85 Ma clearly linked with the Sevier belt uplift. (k) Concurrent regional unconformity arose at ~89Ma at the base of the Niobrara Formation. Hence, the climax of compression caused by the Pacific reorganization at 89-87 Ma impacted both continental margins of the Pacific Ocean.

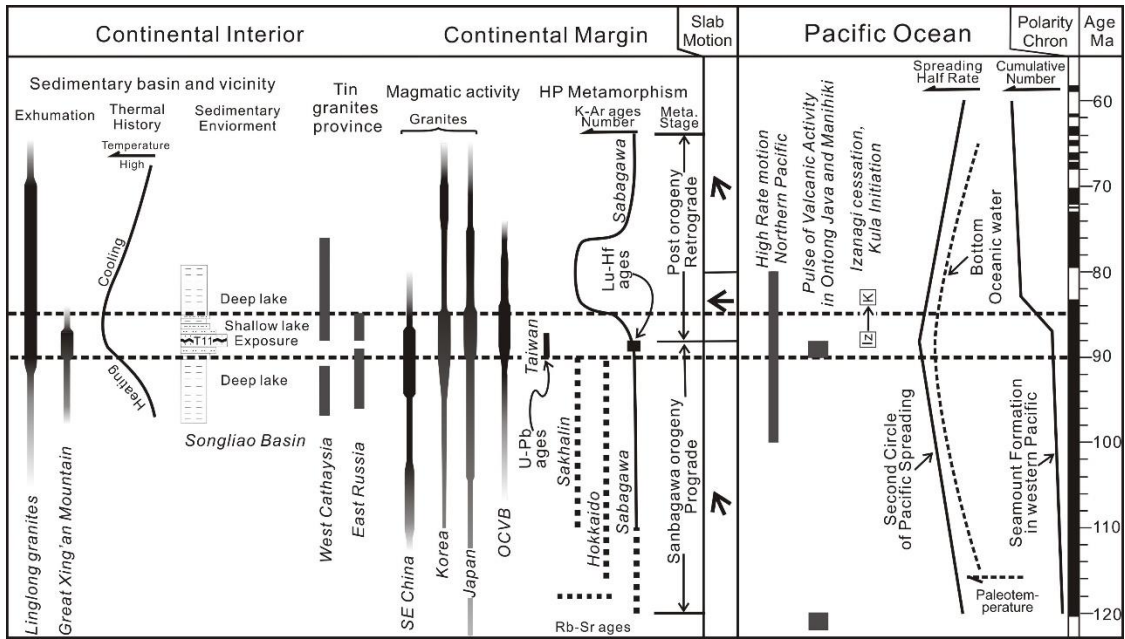


Figure 1: Compilation and summary of geological events described in text; ordered by plate tectonic domain, constrained the climax of compression in Eastern Asia region. Thick dashed line shows the synchronicity of major geological events. Pacific Ocean

