THE ALPINE-HIMALAYAN ZONE OF CONTINENTAL COLLISION AND COLLISION AS A STAGE IN CONTINENTAL EVOLUTION

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Three major orogenic effects result from continental collision. The relatively well-known gently-inclined thrust belts, exemplified by the Himalaya, generally affect only one of the two colliding continental margins, have a thrust polarity the same as that of the final subduction zone, and form long, narrow orogenic belts. Limited syn- to just post-orogenic silicic magmatism is associated with the inner parts of these zones. The second effect of collision, in suitable circumstances, is the generation of large strike-slip fault systems and subordinate rifts on which large crustal blocks move away from nodes of collision of irregular continental margins into neighbouring oceans or remnant oceanic tracts. Magmatism associated with this process is generally limited to rifts and pull-apart segments along transforms. This situation is exemplified by the motion of the Turkish-Aegean block moving along the North and East Anatolian transforms into the Mediterranean, and by the Altyn Tagh Fault at the northern edge of Tibet. The third major effect of collision is only seen along relatively restricted parts of collision zones. This consists of the formation of high plateaus accompanied by uprightfolding and associated subordinate thrusting of the previously undisturbed sedimentary cover, and the generation in or underneath them of large quantities of high-K calcalkaline silicic magmas, together with lesser alkaline magmas. The Turkish-Iranian and Tibetan Plateaus are the exemplars of this effect. The process of formation of such a plateau perhaps may be seen in progress now in the Tsaidam Basin where active WNW-trending folds affect the youngest playa sediments. Their orientation is distinct from E-W folds on the Tibetan Plateau suggesting that a major reorganization of the tectonics may have taken place recently, and that the Altyn Tagh Fault is a very young structure.

The extent of old Gondwanide crustal blocks in Tibet relative to material accumulated in subduction-accretion prisms and their related magnetic arcs is a problem of great interest. Zones of ophiolitic rocks on the plateau may represent sutures between such Gondwanide blocks or material in accretionary prisms. If they are the former, their pre-Cretaceous age indicates that they are the relic sites of the Palaeotethyan Ocean.

Intermittent continuations of such Palaeotethyan sutures recognized westward through Turkey and eastward through Indo China and Malaya.

Ancient sites of continental collision indicate Tibetan-style shortening and crustal thickening with associated calcalkaline magmatism, at least partly derived from partial melting of the thickened, continental crust, are an important stage in crustal evolution which progresses through the stages: ocean floor to island arc to continent to two layer continent. Zones of "reactivation" so commonly recognized in the PreCambrian and mostly by thermal effects on isotopic systems, are readily accounted for by Tibetan-style collision-related orogenesis and magmatism. *Ad Hoc* non-actualistic models for such reactivation are unnecessary.

THE INDUS ZONE: POSSIBLE EVIDENCE FOR EARLY TRIASSIC OCEANIZATION

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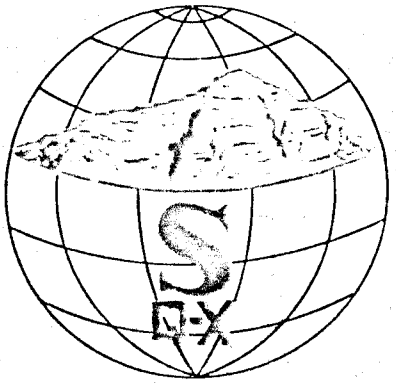
The Indus-Tsang-po suture zone(1)lies North of the Himalayan ranges between the Eurasiatic and the Indian continental blocks. On a large scale geological map(fig.1)it emphasized by a belt of discontinuous outcrops of ophiolites, approximatively lined up in North-South East direction with the exception of a few massifs lying South. The ophiolites are tectonically associated with Cretaceous to Eocene sedimentary units. On a cross section the suture appears as an asymetric fan shaped structure thrusting both India and Eurasia respectively to the South and to the North(1).

Recent studies(2,3,4,5,)conducted in Ladakh, bring new pertinent informations to our knowledge of the suture:

-the ophiolites are characterized by the presence of several facies typical of an ophiolite assemblage: ultramafic complex (particularly harzburgites with a metamorphic tectonic fabric: blastomylonites), gabbroic complex containing cumulates and pegmatites, volcanic flows (pillow lavas and agglomerates); tectonically associated manganiferous red radiolarites and pink limestones (Hallstadt facies).

-the ophiolites constitute in fact an ophiolitic nappe thrusted towards the South onto the Himalayan series. In the area of Photaksar, they outcrop particularly well in a large klippe about 25 km South of the main suture line, in a manner very similar to one of the area of Amlang La where they have been already described(6) and then interpreted(1) as a klippe.

-within the area two other structural units also exist. They are characterized either by a Middle Triassic-Jurassic calcareo-pelitic flysch(the Lamayuru unit)either by a Jurassic(?)to Cretaceous greywacko-pelitic flysch with some vulcanites(the Dras-Nindam unit)(3).



Symposium
on
Qinghai-Xizang(Tibet) Plateau
Beijing, China
May 25-June 1, 1980

Proceedings of Symposium on Qinghai-Xizang(Tibet) Plateau

(Abstracts)

Organizing Committee
Symposium on Qinghai-Xizang(Tibet) Plateau
Academia Sinica