under the accretionary complexes commonly give rise to near planar to very broadly undulating reflectors near the toe of the accretionary complex (Fig. 20; for details see BANGS & WESTBROOK 1991, fig. 5). The reflectors become broadly arched near the middle of the wedge and finally deteriorate into crossing arcuate events near the backstop in the rear parts of the accretionary complex. These are three of the four classes of reflexion response of the lower crust distinguished by SMITHSON (1986). BANGS & WESTBROOK (1991) were able to trace the decollement horizon for 108 km from the toe of the Barbados wedge, i.e. about half its width. Farther back, the decollement horizon becomes deformed mainly by thrusting. Following a collision, the near planar to very broadly undulating reflectors are unlikely to survive as such and would probably turn into either broadly arched or crossing arcuate reflexion events, depending on the intensity of the deformation. Massive intrusions into the accretionary complex would also destroy a part of the reflectors created by sediment underthrusting. It is likely, however, that segments of these reflectors would survive syn- and post-collisional convergence and orogenic magmatic events and would appear as "lower crustal reflectors" under the well-developed, thick accretionary complexes such as that of the Olympic Peninsula in the northwestern United States (thickness under the Peripheral Fault about 40 km!: BRANDON & CALDERWOOD 1990) which themselves would be largely acoustically opaque owing to the complex state of the deformation in them. MOORE & SILVER (1983) display in their fig. 9 such a prominent group of broadly arched reflectors between 5.5 and 6.5 seconds beneath the Molucca Sea collided accretionary complex west of the Snellius Ridge. More recently the BABEL WORKING GROUP (1990) has published a seismic reflexion profile across the Svecofennides in the Baltic Shield, in which crossing arcuate events were interpreted as representing lower parts of a fossil accretionary complex (see BABEL WORKING GROUP 1990, figs. 3a, b, and 5). WINDLEY (1991) interprets the Svecofennides in a manner similar to our interpretation of the Altaids and has suggested that they may be a Proterozoic analogue of the Altaid collage (Prof. B.F. WINDLEY, pers. comm. 1991).

Sediment underthrusting and underplating – even underplating of parts of the oceanic crust – under accretionary complexes provides a way of creating laterally persistent reflectors (between > 100 and 50 km across-strike width, if the present Barbados decollement and the 50% post-collisional shortening in Tibet are taken as possible extremes) at depths ranging from a few to 30 km underlying a highly deformed and diffractive crust, where surface geology would give no indication whatever that laterally continuous reflectors might exist at mid- to lower crustal depths.

8. Conclusions

The main conclusion of this study is that very substantial continental enlargement – not necessarily continental "growth" as this term is now commonly understood – by subduction-accretion has been likely a common process responsible for the primary structuration of the continental crust in the history of our planet as exemplified by the late Proterozoic to middle Mesozoic tectonic history of its largest continent, Asia. As subduction-accretion complexes grow, three main processes contribute to their consolidation and augmentation of their thickness. In decreasing importance these are: 1) Invasion of former forearc areas by arc plutons by the trenchward shifting of the magmatic arc axis as the trench recedes. A corollary to DICKINSON's (1973) view that the arc-trench gap area grows by the regression of the trench oceanward and an opposite retreat of the arc axis continentward in modern arcs might be that for trench and arc axis to move together oceanward, the forearc width, i.e. the width of the accretionary complex, probably must become larger than any of the examples considered by DICKINSON (1973), i.e. more than about 500 km. 2) Continuing bulk shortening of the subduction-accretion complex. 3) Metamorphism of the accretionary complex up to high amphibolite grade either by ridge subduction (PLAFKER et al. 1989), or by the exposure of the bottom of the accretionary complex to hot asthenosphere by steepening of subduction angle.

Subduction-accretion complexes become further deformed and thickened when they are involved in a major continental collision and not uncommonly their lower parts undergo partial melting leading to post-collisional magmatism (e.g. the Permo-Triassic episode in Kazakhstan: see esp. fig. 3 in KARYAYEV 1984; the latest Jurassic-early Cretaceous episode in the Songpan-Ganzi System: ŞENGÖR et al. (in press); the late Miocene to present episode in the East Anatolian Accretionary Complex: PEARCE et al. (1990)), that further differentiates the chemistry of the thus produced continental crust, whose bulk composition would be more silicic than basalt.

Although abundant ophiolitic slivers would exist in vast areas occupied by Turkic-type orogens, these would not necessarily mark the sites of sutures. Intra-accretionary prism thrust faults, but very especially large strike-slip faults, would likely juxtapose assemblages formed in distant regions and deformed and metamorphosed at different structural levels. These faults may mislead the mapping geologist into thinking that they represent sutures, bounding different "terranes". Observations such as these, interpreted in a simplistic manner that does not recognise the vicissitudes of the internal dynamics of accretionary complexes, have indeed led to such agnostic statements as "many nappelike bodies have been thrust onto the continental margin or onto previously accreted terranes, but there is no evidence of concomitant arc and subduction activity. This makes it exceedingly difficult to apply simple plate tectonic models to any specific locale as causes and effects within the entire system cannot yet be related" (BEN-AVRAHAM et al. 1981, p. 52), or "Classic plate tectonic signatures are largely absent or obscure along the margins of the terranes. This suggests most of the sutures which must exist between terranes... are either cryptic or the assembly was made by processes not yet fully understood in classical plate tectonic theory" (CONEY 1981, p. 27).

The one lesson we have learned from the palaeotectonics of Central Asia is that vast areas of continental crust accumulated and consolidated essentially *without involving many collisions!* Hence the enormous architectural difference between the Turkic-type orogens and the "classical" Alpine, Himalayan, and Andean stereotypes, and the tremendous uniformity of structural style throughout much of Central Asia. This is probably also true for much of the western North American Cordillera as recognised by some already in the late sixties and early seventies (e.g. HAMILTON 1969; HSÜ 1971, 1972; BURCHFIEL & DAVIS 1975; DICKINSON 1976, 1977).

The recognition of the Turkic-style orogeny also has taught us a very efficient mode of making continental crust that has a fairly uniform pelitic composition and a reflective lower crust as observed in many places in the continents.

The reason why the tremendous importance of this style of orogeny was not widely recognised earlier was, we think, the undue emphasis placed on Alpine- and Himalayan-type collisional orogens (cf. Şengör 1990a and in press), conditioned by the familiarity of the world geologic community with the tectonics of the Tethysides (cf. Şengör 1989). Few tectonic geologists in the past have looked at orogeny at a truly global scale, and of those who did, few approached the breadth Argand (1924) displayed in his immortal *La Tectonique de l'Asie.* In that work, Argand recognised the occurrence and importance of what we here call Turkic-type orogeny, despite the fact that he never recognised subduction. His recognition was based on the previous ideas that Eduard Suess had developed on marginal continental growth by destroying oceans and led to still more sophisticated models by Otto Ampferer and Franz Eduard Suess. Their views were largely forgotten, however, under the dominance of the Kober-Stille school until the rise of plate tectonics; even with plate tectonics, it has taken a considerable time to recognise the presence and widespread occurrence of Turkic-type orogenic belts owing to their highly complicated and difficult-to-analyse internal architecture.

Acknowledgments

We are grateful to Professors Philippe Matte, Paul Tapponnier, Deng Wanming, Wang Yi and Chang Cheng Fa for sharing with us their knowledge of the geology of the Western Kuen-Lun. Paul Tapponnier and Maurice Brunel supplied to us the most recent French documents of the Franco-Chinese expeditions to the Kuen-Lun. Prof. Maurizio Gaetani supplied us a pre-print of the upcoming expedition report to the western Tibetan plateau and enriched us with many discussions on the same topic. Prof. Xu Shutong and Dr. Aral İ. Okay provided us with much of the recent Chinese publications on the Kuen-Lun. Academician Prof. V.E. Khain, Drs. A.A. Belov, V.S. Burtman, A.A. Bakirov, K. Osmanbetov and L.P. Zonenshain are thanked for discussions and publications on Soviet Central Asia. Prof. B.F. Windley kindly drew our attention to the Svecofennian Proterozoic example of a Turkic-type development. Dr. David B. Rowley reminded us of the isotopic studies of the Stanford Group in the Jungar Basin. Philippe Matte, Kevin Burke and K.J. Hsü reviewed the original typescript and provided much helpful commentary. Finally Şengör is grateful to the organizers of the Argand Symposium in Geneva, in particular to Prof. Daniel Bernoulli, the President of the Swiss Geological Society, for the invitation to read this paper, and to Prof. Jean-Paul Schaer for instructing him about Argand. We take honour in dedicating it to the memory of one of the greatest sons of Switzerland, in whose commemoration we had gathered in his birthplace, Geneva.

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