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PROGRESSIVE IMBRICATE COLLAPSE OF THE SOUTH ALPINE PLATE MARGIN AFTER THINNING BY SUBDUCTION TECTONIC EROSION (STE): A NEW TECTONIC FRAME FOR PENNINIC FLYSCH AND GOSAU SEDIMENTATION

Miles F. Osmaston
The White Cottage, Sendmarsh, Ripley, Woking, Surrey GU23 6JT

In a number of circum-Pacific examples, the well-marked downbend of the subducting oceanic plate occurs, not in the vicinity of the trench, but shallowly displaced several hundred kilometres further beneath the margin. In these cases the subduction interface dips at 3-12 degrees towards the downbend and the lower part of any originally thicker crust (including that of the original arc) is missing. The downbend displacement evidently results from STE developed at the downbend and age data show the displacement to be very rapid, at up to 40% of the plate subduction rate.

Such STE undercutting turns the margin into a huge thrust sheet, resting on the subduction interface. That the margin can then undergo imbricate collapse during open-ocean subduction is probably illustrated by the closely imbricated NE margin of New Zealand.

In the case of the Alps it is proposed that the Austroalpine sheets, the Penninic basement-cored nappes and the main ophiolite bodies were all part of the same margin of the South Alpine Plate, undercut during early Cretaceous southward subduction at a trench lying well within the ocean. The Alpine ocean was thus uncluttered by the microcontinents hitherto invoked to supply the Penninic nappes. Rupture of the sheet and the progressive stacking of its parts beneath one another began in the Cenomanian. Ocean floor materials between the Penninic nappes show that, before the next (lower) nappe was detached and dragged down to near the subduction downbend, the locus of plate convergence reverted temporarily to the original trench site.

As each N-vergent rupture developed within the sheet, both foredeep flysch and backslope sediments, of appropriate compositions, could have been generated. Meanwhile, flysch development at the northern (accretionary?) trench would probably have continued despite temporarily interrupted convergence there.

Among the advantages of the model are:
(1) it provides an actualistic answer to what has become of the lower crust of the Austroalpine and Penninic nappes,
(2) it provides, as appropriate, for the generation of Penninic flysch devoid of ophiolitic debris; this is very difficult in a model based on the tectonic accretion of ophiolitic and micro-continental slices alternately.

In the new model, Penninic and Austroalpine flysch and Gosau (s.l.) sedimentation should form complementary parts of the imbricate collapse history of the South Alpine margin. Sedimentological input in this regard would be welcomed.