

## The New Hebrides Back Arc Troughs : an Example of Slow Tensional Structure

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The New Hebrides back-arc troughs are restricted to the southern and northern rear of the arc. Lack of trough in the central part is related to the compression induced by the collision of the Entrecasteaux ridge and the New Hebrides arc.

The southern troughs are 50-60 km wide and are composed of one or two grabens striking N130-140°, while the northern troughs extend over 70 km wide and are composed of a succession of N-S trending grabens, horsts and half-grabens. Although the location and the main trend (N150°) of the troughs indicate that they are largely guided by the subduction, the direction of extension (N30° to N40° for the southern troughs, N45° to N60° for the northern trough) is clearly oblique to the volcanic line and thus does not seem only led by the New Hebrides subduction process. Lack of island arc tholeiitic lavas in the volcanoclastic series outcropping along the eastern scarps of the different troughs since 2.7-2.2 Ma, can be considered as an evidence of the initiation of the troughs structuration, which is not necessary synchronous all along the back-arc domain. The formation of the troughs is polyphased and the tectonics is still active. The thickness of the sedimentary filling inside the half grabens of the northern troughs is in good accordance with the Pre 2 Ma age proposed for the onset of the extensional tectonics. The geometry of this filling indicates that the tectonic activity has been continuous with accelerated phases underlined by unconformities

The volcanism developed on the flanks and bottom of the troughs presents no important geochemical difference with the New Hebrides arc volcanism. However, a low-K acid volcanism emplaced since 1.8 Ma could be associated with punctiform initiation of opening in the northern troughs.

Formation of the New Hebrides back arc troughs may result from extensional tectonics induced by a major reorganization at 3 Ma of the seafloor spreading of the North Fiji basin, which since this time appears to be developed independently of the subduction process. Although the strain is continuous from 3 Ma the rate of extension in the troughs is very low. In the studied area there is no young crust related to a recent back arc spreading. The troughs are largely developed on the oldest part of the North Fiji basin oceanic crust. In that particular environment the volcanism activity initiated 1.8 Ma ago into the northern troughs and still recently active might be considered as a punctiform spreading.

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