

THE WESTERN MARGIN OF THE NEUQUEN BASIN (ARGENTINA) IN THE UPPER JURASSIC AND LOWER CRETACEOUS

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RESUMEN: Los sedimentos del Jurásico Superior y Cretácico Inferior (138 - 117 Ma) de la Cuenca Neuquina (Argentina) son origen de un arco magmático en el oeste, una región metamórfica (Macizo Norpatagónico) en el sur y un orógeno de colisión retrabajado en el este. El arco magmático aparece en forma de "transitional arc" y "dissected arc".

KEY WORDS: Upper Jurassic, Lower Cretaceous, sediment provenance, magmatic arc, Neuquen Basin, Argentina

The Neuquén Basin, situated approx. 33° - 40° S and 67° - 71° W, forms the southern part of the Andean Basin. It is bordered in the east by the block of San Rafael and in the south by the North Patagonian Massif. In the west it is limited by a magmatic arc as is suggested by DIGREGORIO & ULIANA (1980) and other authors. In this study type and effectiveness of the magmatic arc from the Late Jurassic up to the Early Cretaceous (138 - 117) are discussed. For this purpose, modal analyses of sandstones and heavy mineral analyses were carried out. The stratigraphical classification of profiles and samples was based on the sequence stratigraphical investigations by LEGARRETA & GULISANO (1989).

As a result of the modal analyses of sandstones from the southern part of the basin, two different source areas for the sediments could be identified. The influence of a third source area could be detected only by heavy mineral analyses. In general it can be said that sediments originate from both a magmatic source area in the west and a metamorphic area, indicated by the heavy mineral contents of the sediments, in the south or southwest of the Neuquén Basin. The third source area becomes noticeable only for a short time when sediments from the east, derived from a reworked collision orogen, are being transported into the northern Neuquén Basin.

The sequence stratigraphical division of the sequence and facies maps, derived from it, show that the basin was continually subjected to strong, short-termed changes in extension and facies distribution. The reasons for these changes are sea level fluctuations which are connected with and correspond to the global eustatic changes.

By classifying the samples sequence stratigraphically, it was possible to sort and interpret the results of the modal and heavy mineral analyses more accurately. The data clearly indicate that the magmatic source area is a magmatic arc which is bordering the basin in the west and presumably forms a barrier to the Pacific

Ocean open from time to time. Additionally, different levels appear to have been eroded within the magmatic arc: During the Tithonian (138 Ma) the magmatic arc supplies material which corresponds to a transitional arc (*sensu* DICKINSON 1985). In the further development of the source area -- during the lower and upper Berriasian (130,5 Ma) and the uppermost Berriasian (128 Ma) -- the transported material comes from a dissected arc. This proves that also parts of the plutonic root of the magmatic arc have been eroded. In the lower Valanginian (126 Ma) and upper Hauterivian (117 Ma) the characteristics of the transported sedimentary material can again be related to a transitional arc.

In the east to northeast a reworked collision orogen borders the basin and supplies material into the northern Neuquén Basin for a short time (at 128 Ma). The southwest and south of the basin is limited by a metamorphic highland (North Patagonian Massif) where the supplied material is mixed with detritus from the western magmatic arc.

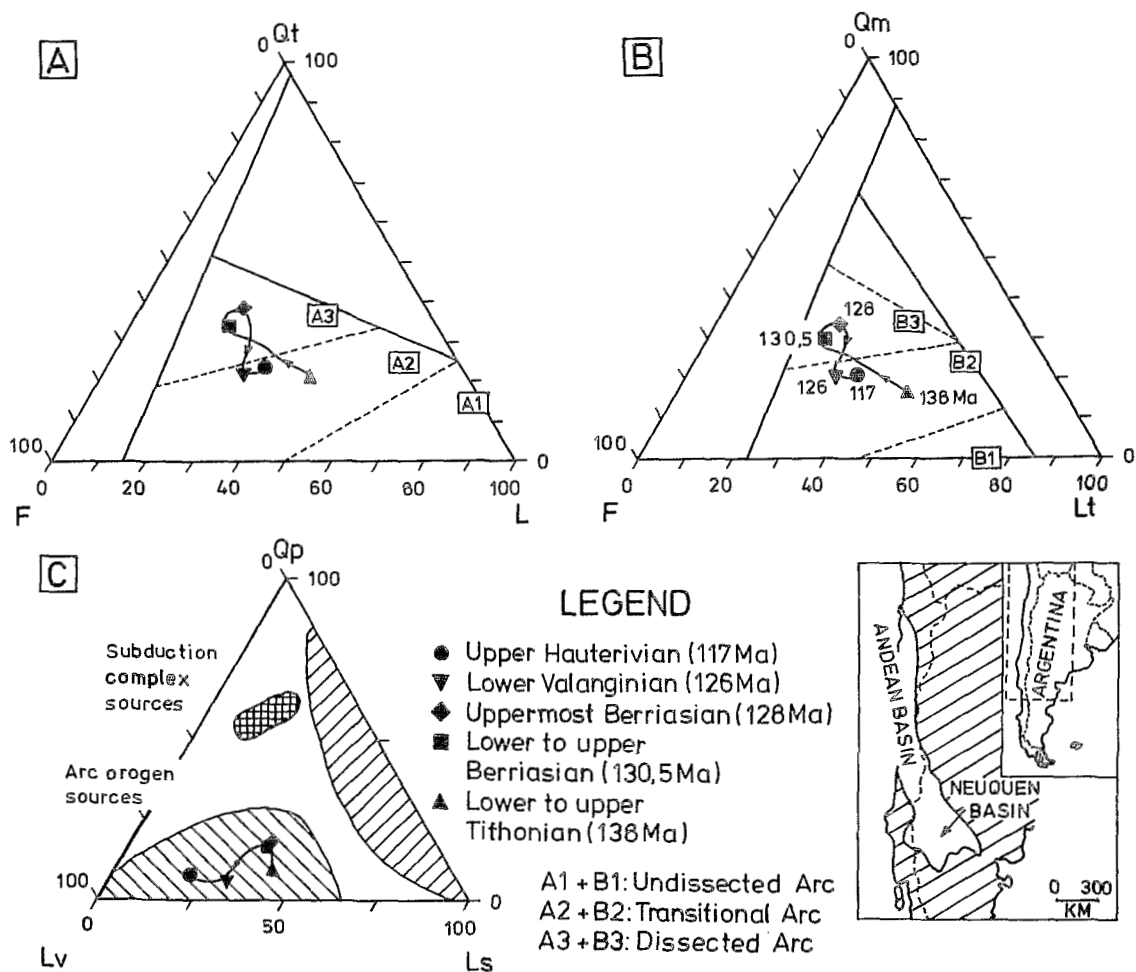


Fig. 1. Variations of provenance of sediments, Neuquén Basin (Argentina). Diagrams after DICKINSON (1985); arithmetic mean of 65 samples

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