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Geochemical properties and provenance characteristics of the Early-Middle Jurassic sandstone and shales, NE Turkey

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The sediments deposited in the Mesozoic basins of the Eastern Pontides should have been derived from Hercynian basement which continued to remain as provenance throughout the Mesozoic. Therefore, Early Jurassic clastic rocks can supply significant information on the lithological components of eroded portions of the basement. However, the case should be taken to account that certain amount of material would have been transferred from Early Jurassic basic arc volcanism into the basin.

Within this context, totally there stratigraphic successions, which one is from the Bayburt and other two are from the Gümüşhane, were investigated in terms of their sandstones and shales, which are thought to reflect well the source area characteristics. Petrographical observations suggest that basic volcanic rock fragments as well as pyroxene and amphibole clasts could have been moved to the basin from syncronous basic arc volcanism. Others, such as quartz, feldspar and felsic rock fragments, point to the Paleozoic basement which continued to remain as provenance throughout the Early Jurassic.

Whole-rock major and trace element contents of the sandstones and shales are consistent with the petrographical observations. Transition elements, such as Sc, Cr and Co, which represent the proportions of mafic components in the clastic rocks and lithophyle elements, such as Th and U, which measure the proportion of felsic component display large distribution intervals in these rock. This situation also points out that the rocks in the source area display a wide compositional spectrum varying from mafic to felsic. However, in the region studied was the subduction related basic volcanism known throughout the Early to Middle Jurassic. In this case, there is a possibility that felsic components were derived from Paleozoic basement, whereas much of the mafic component was moved into the basin from Early Jurassic basic arc volcanism. In the tectonic discrimination diagrams, the rocks define more than one setting, e.g., island arc, active continental margin and passive margin, which is thought to be a result of above described situation