Doctoral thesis

Multilateral research of stream sediment based on its geochemical composition and heavy minerals

– Case study for modern river mouth sediments around Lake Biwa, southwest Japan –

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Summary

The purpose of this study is to evaluate the performance of heavy mineral analysis and geochemical analysis of sedimentary rock for provenance research, and to propose more accurate analysis method. For this purpose, I studied modern river sediments around Lake Biwa where the geology and topography are clear in present, and whether the actual geology can be figured out by heavy mineral analysis and geochemical analysis. Data of sampling points of 33 modern sediments, detailed data on heavy mineral analysis and geochemical compositions of each samples are all included in this thesis. In the discussion, the 33 samples were broadly divided into three groups based on the geological distribution of the 17 river basins from which they were obtained, and using various existing concepts for estimating hinterland geology the relationship between the characteristics of sediments and the characteristics of the whole river was examined. As a result of integrated examination, it was revealed that the heavy mineral analysis has an advantage that it is possible to suggest the kinds of geology that may be distributed in the hinterland with a high resolution. On the other hand, the geochemical analysis has an advantage to estimate the geology mainly distributed in the hinterland. In these two analytical methods, it is sometimes obtained that concentrated heavy minerals and/or elements concentrate. These are by some properties such as gradient and length of the river. Therefore, it would be better way to use two analytical methods simultaneously to estimate the hinterland.