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海底热水活动与海相富有机质层形成的关系——以华北新元古界青白口系下马岭组为例 [点此下载全文](#)

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摘要:

对华北新元古界青白口系下马岭组富有机质层段的常量元素、微量元素和有机质含量进行了系统分析,其基本特征是富有机质沉积层段的SiO₂含量明显高于泥质岩中的含量, SiO₂含量与TOC成正相关关系,与TiO₂含量成反比, Si / (Si Al Fe)比值与TOC成正相关关系;与海底热水流体活动有关的P、Cu、Zn、Co、Ni、V等元素含量明显富集, Ba / Sr比值远远大于1,且与TOC之间成正相关关系。在下马岭组剖面上,从Qb_{1x}³向上纹层~薄层状硅质岩夹层增多,有机质含量也开始急剧增高。地质地球化学特征表明,在下马岭组富有机质沉积层段形成时,盆地拉张沉降作用强烈,海底热水活动与之紧密相伴,而且海底热水流体活动是导致该富有机质沉积层段形成的主要原因。

关键词: [海底热水活动](#) [下马岭组](#) [海相沉积](#) [有机质](#)

Hydrothermal Venting on the Seafloor and Formation of Organic-rich Sediments --Evidence from the Neoproterozoic Xiamaling Formation, North China [Download Fulltext](#)

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Abstract:

The Neoproterozoic Xiamaling Formation in the Yanliao depression consists mainly of black-gray shale, yellowish green shale, silty mudstone and cherts. In the black-gray shale, laminar and thin-bedded cherts are widely distributed. Samples systemically collected from the Xiamaling section in Beijing and Xiahuyuan section in Hebei Province are analyzed with the X-ray fluorescence spectrum and analysis of pyrolysis (Rock-Eval) instrument. The results shows that the content of SiO₂ in the organic-rich layers ranges from 69.63% to 91.09%, higher than in the normal mudstone, and is in direct proportion to the total organic carbon (TOC), but in inverse proportion to the contents of TiO₂, which is typical of terrigenous component. The elements of Pb, Zn, P, Co, Ni and V, which are related to hydrothermal venting on the seafloor, and are rich in the organic-rich sediments, and in direct proportion to TOC. The ratio of Ba/Sr in the organic-rich sediments ranges from 5.6 to 31.8, which suggests that hydrothermal venting on the seafloor was strong. In the Xiamaling section, laminar and thin-bedded cherts in shale increase in volume gradually from Qb_{1x}³ to upper strata, along with a rapid increase in the content of TOC. The geology and geochemistry indicate that the basin was in strong extension and depression during the formation of the organic-rich sediments of the Xiamaling formation and hydrothermal venting followed with tectonism. Hydrothermal venting on the seafloor can supply nutrition for thermophile microorganism blooming in the area of hot water, and result in the formation of anoxia in bottom water beneficial for the preservation of organic matter.

Keywords: [Xiamaling Formation](#) [hydrothermal venting](#) [organic matter](#) [marine sediments](#)

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