Dust as main sources of preanthropogenic lead in central pacific deep water

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The dominating factors controlling preanthropogenic Pb isotopes in central Pacific deep water over the Cenozoic are still controversial. The debate mainly focused on whether regional eolian dust or volcanogenic aerosol is the dominant source for seawater dissolved Pb budgets. The latest research surmised that soluble Pb released from eolian dust in the seawater was originated from atmospheric deposition of globally well mixed volcanic aerosols from the stratosphere and further suggested that this kind of volcanic aerosol dominated the sources of dissolved Pb in the central Pacific over the Cenozoic.

In this study we found two difficulties faced by the volcanic aerosol model: 1) Lead flux from aerosol may have been too low to be a dominant flux over the local dust inputs in central Pacific deep water so that 2) Pb isotopic compositions were actually not homogenous but recorded very localized signals in all ocean basins. Moreover, evidences from patterns of trace elements leached together with Pb from Fe-Mn oxides (e.g. particle reactive elements enrichment, relative depletion in HFSE and highly soluble elements) are consistent with their derivation from chemical weathering of mineral dust. Mass balance consideration also precludes a predominantly volcanogenic Pb source for the leachable phase of loess. The less radiogenic Pb of the leachates than the bulk loess can be fully explained by a time-integrated effect of lower U/Pb and Th/Pb of the leachable phases. Furthermore, Pb isotopic evolution of the eolian silicate fraction of central Pacific core GPC3 actually reflects the local eolian signal rather than the global stratospheric volcanic aerosol imprints. Pb isotopes in central Pacific deep water also did not correspond to any main change of volcanic activity or continental sediment flux to the Pacific marginal seas, suggesting that both Pb from volcanic aerosol and Pb advected from the marginal Pacific may be insignificant compared with the regional eolian input via dust deposition. We thus propose that dust input should be the dominant source for the Cenozoic Pb in central Pacific deep water.

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The Ar-Ar geochronological study of the shear zone-type gold deposit of East Tianshan, Xinjiang, NW China

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The Ar-Ar isotope geochronological study of the Kanggur, Hongshi and Hongshan, three typical shear zone-type gold deposit located in Qiugemingtashi-Huangshan large-scale ductile shear zone in the middle of the East Tianshan orogenic belt, NW China, shows that the time of the gold deposit mineralization is in agreement with that of the strike-slip shear deformation of the shear zone in its late period. The main shear deformation time of the Qiugemingtashi-Huangshan ductile shear zone is between 262.9Ma-242.8Ma [1], while the gold mineralization time of the shear zone-type gold deposit is between 261.0Ma -246.5Ma. This high concordance proves that the late right–lateral strike-slip shear deformation is the main reason for the gold mineralization.

The agreement between the gold mineralization time and the right–lateral strike-slip shear deformation time shows diversity in different part of the shear zone. The fast uplift of middle-western part of shear zone happened in 261.5Ma-262.9Ma while the main mineralization time of the Kanggur gold deposit is between 261.0Ma -252.5Ma, which indicates that the mineralization of the Kanggur gold deposit began just after the fast uplift of the middle-western shear zone. In the eastern part of shear zone, the fast uplift happened in 247.1Ma-246.9Ma while the main mineralization time of the Hongshan gold deposit, situated in the north area of the eastern shear zone, is between 246.9Ma-246.5Ma, which indicates that the mineralization of this gold deposit also began after the fast uplift of the eastern part of shear zone.

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[1] Chen *et al*.(2005) *Acta Geological Sinica* **79** (6) 790-804.