The relatinship between gold mineralization and hydrocarbon accumulation in the Youjiang basin, South China

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The Youjiang basin in South China lies along the southwestern margin of the Yangtze craton and developed upon a lower Paleozoic basement. It is characterized by containing many sedimentary-rock hosted, disseminated Au deposits of the Carlin-type. Meanwhile, the basin is also well-known as an important host to abundant fossil oil reservoirs and has attracted wide attentions of petroleum geologists. The gold deposits spatially show close association with paleo-petroleum reservoirs, suggesting a genetic linkage between Au mineralization and hydrocarbon accumulation.

The fluid forming paleo-petroleum reservoirs is characterized by a low temperature (typically between 90~160℃) and a low salinity (mostly below 6 wt % NaCl), with main components of hydrocarbon, CO_2, and H_2O. The ore-forming fluid of gold deposits has a medium to low temperature (typically between 150~250℃) and a low salinity (0.4~6.7 wt % NaCl) and is composed mainly of H_2O and CO_2 and subordinately of hydrocarbon. The spatially close association of paleo-hydrocarbon reservoirs and gold deposits, the contemporaneous activity of reservoir fluid (240~185 Ma) and ore-forming fluid (270~170 Ma), and the intimate relationship in reservoir and ore genesis suggest that both the paleo-oil reservoirs and the gold deposits are products of organic ore-forming basinal fluids. During the late Caledonian to the middle Indosinian, the sedimentation of deep-water, organic- and metal-rich mudstone, siltstone, and micrite in the basin laid a material base for the formation of hydrocarbon reservoirs and Au deposits. The activation of organic ore-bearing basinal fluids during the late Hercynian to early Indosinian was responsible for both gold and petroleum accumulation. Extensive tectonic uplift and denudation during the middle and late Yanshanian have greatly reworked and destructed the deposits and reservoirs.

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Chemical and isotopic properties of airborne particles in urban and rural environments of the Rhine valley

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A passive 'Sigma-2' device has been used for sampling and chemical/isotope analysis of airborne particles (<100μm); collection time was four weeks. Automated light- or electron-optical analysis of the sampling substrates collected during 1 week in urban and 2 weeks in rural environments provides mass-concentration and mass-deposition rates (MDR). MDR in rural environments are on average 5 times lower ($2mg/m^2/d$) than those in cities ($9mg/m^2/d$). They appear to be strongly controlled by traffic and industrial emissions and, therefore, depend on sampling locality and wind direction. MDR are positively correlated with those deduced from total mass of trace element deposition.

The continental crust-normalized trace element data show distribution patterns very similar to those of tree barks collected at corresponding sampling sites. This confirms our suggestion that tree bark biomonitoring yields very reliable informations of atmospheric pollution (Lahd Geagea *et al*. 2008). The trace element distribution patterns of samples from rural and urban environments are similar, indicating that the dust traveling over long distances has taken up characteristic anthropogenic signatures. Only dust samples collected within a distance of 5 kilometers from industrial sources allow recognition of source caracteristics like lanthanum enrichments typical for steel plant emissions (Lahd Geagea *et al*. 2008). Trace element deposition rates are highly variable and range between a few mg $ha^{-1}y^{-1}$ (e.g. U), g $ha^{-1}y^{-1}$ (e.g. Pb) and up to 15 kg $ha^{-1}y^{-1}$ (Ca in rural environments with agricultural activities). Pb isotope data allow to distinguish between traffic, industrial and baseline compositions. The industrial aerosols, however, are only distinguishable with help of Sr and Nd isotopes.