# Noble gas isotope studies of Ningwu Ore District, Middle-Lower Yangtze River polymetallic ore belt, East China

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Different causes, such as the atmosphere, the Earth's crust, mantle and sources of abundance and of the noble gas isotopic composition is significantly different. Typical ratio of helium in the Earth's crust $^3He/^4He$ is $10^{-8}$, $^3He/^4He$ value of $10^{-5}$ of mantle helium, difference of nearly 1000 times.

So helium argon and other noble gas isotope has become a research of crust-mantle interaction, the tracer mantle fluid mineralization and different ore-forming fluid mixed effective means and the most sensitive tracer.

In this study, the concentration and isotopic compositions of noble gases were measured in pyrite and magneti phenocrysts of 11 iron ore from Ningwu ore district Gaocun and dongshan, $^3He$ / $^4He$ ratio is 1 Ra ~ 0.04 Ra,□Ra :$^3He$ / $^4He$ ratio of air 1.4□$10^{-6}$ □, The He isotopic study shows, the environment of different $^3He/^4He$ ratio, showed there was no With the same degree of deep fluid. Typical characteristics can be seen as the mantle fluid.

# Model-predicted and satellite-retrieved tropospheric $NO_2$ columns over East Asia

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In this study, we attempted to evaluate $NO_x$ emission fluxes over East Asia for the year of 2006, using CMAQ-predicted and OMI-retrieved tropospheric $NO_2$ columns. The two retrieved OMI products were taken from the Level-2 DOMINO product version 2 (using KNMI algorithm) and from the Level-2 OMNO2 product version 2.1 (using NASA algorithm). The two OMI products were well correlated (R=0.98 over Central East China). Also, averaging kernels (AKs) taken from each OMI product were applied to the CMAQ-predicted $NO_2$ columns ($\Omega_{CMAQ}$) for the comparison analysis. The applied $AK_{KNMI}$ (i.e. AK retrieved from the KNMI algorithm) to the $\Omega_{CMAQ}$ showed seasonally good correlations with the $\Omega_{OMI,KNMI}$ (R=0.75, slope=0.92). Howere, the $\Omega_{CMAQ}$ with the $AK_{NASA}$ showed larger values than the $\Omega_{OMI,NASA}$ from the OMI observations despite of good correlation coefficient (R=0.75) because the $AK_{NASA}$ are vertically even larger by factors of approximate 2 – 10 than $AK_{KNMI}$ over Central East China (CEC). The differences between the $\Omega_{CMAQ}$ and $\Omega_{OMI}$ using the NASA algorithm were much larger than those using the KNMI algorithm during the winter episodes, whereas the differences were smaller using the NASA algorithm than those using the KNMI algorithm. In addition, this study investigated the large discrepancies between CMAQ-predicted and OMI-retreived $NO_2$ columns during the winter episodes in terms of the sesonal variations of $NO_x$ source and heterogenous $NO_x$ sink. First, the seasonal variation of the $NO_x$ emissions influenced greatly in the tropospheric $NO_2$ columns. For example, when non-seasonal factor were applied to the CMAQ model simulation, the $\Omega_{NO2,CMAQ}$ decresed by 38% over CEC regions during winter, compared to those from the our baseline simulation. For the latter, four parameterizations of gamma $N_2O_5$ were applied to the separete CMAQ model simulations during the cold seasons.

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