Geochemistry and tectonic setting of the Cretaceous alkaline complex in the South-western margin of the Ordos Basin, North China Craton

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The alkaline complex is located at the junction zone between two fold belts, i.e. thrust belt in the western edge of the Ordos Basin and the Qinling Orogenic Belt, Central China. It was emplaced along a narrow linear W-E Mesozoic deep fault belt across southern margin of the North China Craton. Seismic exploration revealed the complex includes at least nine separate intrusions distributed in an area of more than 70 km^2. Drilling cores reveal the multilayered complex intrusion occurs from 1961 m to 3710 m, embedded in the sedimentary rocks of various ages, from Proterozoic- Triassic. The complex is composed of nepheline syenite, monzonite diorite, alkali-feldspar trachyte, garnet syenite, aegirine-augite syenite from top to bottom. All types of rocks of this complex show high REE contents (ΣREE185.58-499.80), high LREE/HREE ratios (14.02-31.39), as well as high $(La/Yb)_N$ ratios (63.97-21.13), without significant δEu anomalies. Chondrite normalized REE patterns of rock samples show LREE segments steep rightward against HREE curve segments basic level. Major element compositions of the complex show high K_2O+Na_2O (6.48-12.32% wt), low SiO_2 (48.86-62.70% wt). while trace element compositions reflect high Sr/Y (67.04-102.64), Zr/Hf (43.10-65.76) and Nb/Ta (18.04-19.93) values, while low Y/Nb (0.533-0.791) values. It is enrichment in LILE (e.g. Rb, Sr, Ba, Th, etc.) and depletion in HFSE (e.g. Nb, Ta, Ti, P). LA-ICP-MS zircon U–Pb analyses indicate that the complex was emplaced at the time of 114±1.1Ma. Intrusion occurred in the early Cretaceous. It is proposed that the complex formed in the extension tectonic setting. The parental magmas probably derived from partial melting of an enriched metasomatic mantle. It is closely related to the geodynamic background of North China craton lithospheric thinning, magmatic underplating and tectonic conversion.

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The impacts of mariculture on mercury distribution in sediments and cultured fish

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To study the impact of mariculture on mercury speciation and distribution in sediments and cultured fish around Hong Kong coastlines, samples were collected from six mariculture sites and corresponding reference sites.

Total mercury (THg) concentrations in the surface sediments of mariculture sites were significantly higher ($P<0.01$) than corresponding reference sites. However, methylmercury (MeHg) concentrations and the ratio of MeHg to THg in mariculture sediments were lower ($P<0.05$) than corresponding reference sites. The ratio of MeHg to THg in sediments was inversely related ($r=-0.579$, $P<0.05$) with organic matter content across the sites, indicating that organic matter affected Hg methylation in surface sediments.

Total mercury and MeHg in muscles of three cultured fish species were analyzed. The average MeHg concentration in muscle was 75ng/g, below the WHO limit of 500ng/g [1].

Mariculture activities increased THg loading in sediments by the input of unconsumed fish feeds and fish excretions. However, the complexation of Hg with ligands in the organic matter beneath the floating cages reducd Hg bioavailability to methylation bacteria, and thereby inhibited MeHg production [2]. Accordingly, changes in allochthonous organic inputs could affect the production of MeHg by altering the bioavailability of mercury buried in the sediments [3].

In general, there was a significant decrease in fish muscle MeHg and THg concentrations with fish length and weight for red snapper (*Lutjanus campechanus*) and snubnose pompano (*Trachinotus blochii*), which may be related to the dilution effect on mercury concentration according to fish growth.

[1] WHO (2003) *JECFA 61st Meeting,* 18. [2] Ullrich *et al*. (2001) *Crit. Rev. Env. Sci. Technol.* **31**, 241–293. [3] Hammerschmidt *et al*. (2008) *Mar. Chem.* **109**, 165–182.