Impact of parent rocks and diagenetic evolution on sandstone reservoir quality with low to very low permeability

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Sandstone types, characteristics of fragments and cements, pore types and reservoir quality, and their horizontal distribution of the He 8 and Shan 1 Group, Permian of the Upper Paleozoic from the northern Ordos Basin, China is studied, based upon observation of bore cores, use of multiple analytic measurements. The major factors impacting the reservoir quality is discussed. Results show that feature of parent rocks and diagenetic evolution is the major element which affects the reservoir quality. Parent rocks determined sandstone types and primary pore skeleton, resulting in three types of quartzarenite, lithic quartzarenite and lithicarenite with average primary porosity of 35.1%, 34.2% and 33.6%, respectively. Parent rocks also influenced diagenetic paths and types of cements, which led to diversity pores and pore throats, thus varied reservoir qualities. The sandstones experienced the early (P-T) and late (T_3-K_1) diagentic evolution phases, and three hydrocarbon charging stages during T_3, J_2-J_3 and K_1 as well. Compaction occurred in the early diagenetic phase caused average porosity for quartzarenite, lithic quartzarenite and lithicarenite is 17.4%, 18.3% and 18.5%, respectively. Cementation mainly occurred in the late diagenetic phase resulted in average porosity for quartzarenite, lithic quartzarenite and lithicarenite is 15.0%, 15.8% and 14.8%, respectively. The quartzarenite, with average macro-pores of 3.8%, is the excellent natural-bearing reservoir sandstone type in the studied area.

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Migration of toxic elements in biogeochemistry chains in residents and farmlands near a Pb-Zn Mine

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Biogeochemistry investigation has been conducted in the last five years in the human residents and farmlands near a lead-zinc mine in the suburb of Nanjing city, southeast China. People have lived very close to the mine. Water, soils, plants and animal tissues, as well as human blood, were sampled, and Pb, As, Cd and other minor and trace elements in them were determined by X-ray fluorescence spectrometry, inductively couple plasma atomic emission spectrometry and mass spectrometry.

Pb, As and Cd in the samples of water, soil and dust particles taken from the investigation areas were partly or generally higher than the critical level ruled by Chinese environmental standards. For example, the maximum of Pb concentrations in irrigation water was about four times higher than the standards. The concentrations of Pb, As and Cd in farmland soils were beyond the national quality standards for the edible vegetable soils. Parts of data were shown in Table 1.

Pb and As in leaf vegetable samples were beyond the national quality standards. Parts of Pb, As and Cd in animal tissues displayed the same trends. High concentrations of Pb in human blood and bone were observed.

	Max. in Irrigation Water	Means in Vegetable soils
Pb	13.2	296
As	0.17	59
Cd	0.16	1.4

Table 1: Concentrations of toxic elements