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Geochemical and palynological analyses of the Shivee Ovoo coal deposit (Choir-Nyalga basin, Central Mongolia)-palaeoclimatic implications

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The Shivee Ovoo is one of the big industrial mine of continental Choir-Nyalga basin in central Mongolia. The depositional environment and petroleum source rock potential of major coal-bearing strata in the Choir-Nyalga basin has been studied (Erdenetsogt et al., 2009, 2022), and age of the deposits (Khukhteeg Formation) has been assigned to Aptian-Albian on the basis of radiometric age of intercalated tuff (Hasegawa et al. 2018). We carried out a geochemical and palynological study on 10 samples (47 m mine wall) collected from Shivee Ovoo.

Geochemical analysis completed for major, trace, and rare earth elements (REE) in the SGS laboratory in Mongolia. Palynological study was carried out at the Basic Research Laboratory of National University of Mongolia. Fossil palynomorphs were investigated by LM using single grain technique (Hesse et al., 2009). As a result of geochemical analysis of major oxides, SiO₂ has the highest content with 44.2%-66.9%. Following this Al₂O₃ (16.24%-19.14%), K₂O (1.03%-4.09%) and TFe₂O₃ (total iron) (1.75%-3.36%) are the second most abundant oxides. The rest of the oxides (MgO, Na₂O, P₂O₅, MnO, CaO and TiO₂) have concentration of less than 2.31%. The Al/Si ratio was between 0.26-0.41, SiO₂ is related with quartz. The chemical weathering parameter CIA varies 71.3-81.6, with an average of 78.97, showing intermediate chemical weathering. Also, the Zr/Rb ratio 0.93 it can be seen the hydrodynamic force was weak. Generally, V/Cr:1.18, U/Th: 0.4, δU:1.68 implies oxidation environment. All weathering parameters show oxidation environment during sedimentation indicating that the paleoclimate is a warm and humid.

Palynological data, 6 of the 10 samples contain rich palynological fossils providing important information on the paleovegetation and paleoclimates. Sporomorph plants in the Khukhteeg formation contain 23 genera, 32 species. The palynological percentages of plants Cyathidites 32%, Baculatisporites 20%, Osmundacidites 11.1%, Gingkocycadopites 11%. Dominant plants mainly belong to the Filicales of the ferns represented by Osmundacidites and Dicksoniaceae. The plants 63.1% grow swamps, wet valleys, subtropical temperate zones. This palynological and geochemical

data indicate that the at 47m depth Khukhteeg formation had a warm subtropical climate was at that time.

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