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Hydrocarbon potential of Early Cretaceous lacustrine sediments from Bima Formation, Yola Sub-basin, Northern Benue Trough, NE Nigeria: Insight from organic geochemistry and petrology

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2 **Sub-basin, Northern Benue Trough, NE Nigeria: Insight from organic geochemistry and**
3 **petrology**

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12
13 **Abstract**

14 The Early Cretaceous lacustrine sediments from Bima Formation in the Yola Sub-basin,
15 Northern Benue Trough, northeastern Nigeria were studied based on organic geochemistry
16 and petrology. This is in order to provide information on hydrocarbon generation potential;
17 organic matter type (quality), richness (quantity), origin/source inputs, redox conditions
18 (preservation) and thermal maturation in relation to thermal effect of Tertiary volcanics. The
19 total organic carbon (TOC) contents ranges from 0.38 - 0.86 wt. % with extractable organic
20 matter (EOM) below 1000 ppm and pyrolysis S₂ yield values from 0.16 to 0.68 mg/g,
21 suggesting poor to fair source rock richness. Based on kerogen pyrolysis and microscopy
22 coupled with biomarker parameters, the organic matters contain Type I (lacustrine algae),
23 Type III (terrestrially derived land-plants) and Type IV kerogens deposited in a mixed
24 lacustrine-terrestrial environment under suboxic to relatively anoxic conditions. This suggest
25 potential occurrence of Early Cretaceous lacustrine sediments (perhaps Lower Cretaceous
26 petroleum system) in Yola Sub-basin of the Northern Benue Trough as present in the
27 neighbouring basins of Chad, Niger and Sudan Republics that have both oil and gas generation
28 potential within the same rift trend (WCARS). Vitrinite reflectance (%Ro) and T_{max} values of

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