

GEOCHEMISTRY OF APTIAN-ALBIAN LIMESTONE OF MURAL FORMATION, NORTHERN SONORA, MEXICO

J.MADHAVARAJU¹, C.M.GONZÁLEZ-LEÓN¹, YONG IL LEE² and J.S.ARMSTRONG-ALTRIN³

¹Estación Regional del Noroeste, Instituto de Geología, Universidad Nacional Autónoma de México, Apartado Postal 1039 Hermosillo, Sonora 83000, México. E-mail: mj@geologia.unam.mx

²School of Earth and Environmental Sciences, Seoul National University Seoul 151-747, Korea

³Centro de Investigaciones en Ciencias de la Tierra, Universidad Autónoma del Estado de Hidalgo, Ciudad Universitaria, Carretera Pachuca-Tulancingo km. 4.5, Pachuca, Hidalgo, 42184, México

The Aptian-Albian limestone of Mural Formation is well developed in the Northern Sonora, Mexico. It includes thick succession of limestone and shale and these sedimentary rocks were deposited during transgressive-regressive cycles. The marine Mural Formation is sandwiched between fluvial deposits of Bisbee Group. The Mural Formation is mainly consists of six members viz. i) Cerro La Ceja (CLC), ii) Tuape Shale (TS), iii) Los Coyotes (LC), iv) Cerro La Puerta (CLP), v) Cerro La Espina (CLE) and vi) Mesa Quemada (MQ). Major, trace and rare earth elements (REE) were carried out on the limestone of Mural Formation in order to find out the geochemical variations among different litho-units. In addition, petrographic study also carried out on the limestone of Mural Formation to understand the various petrographic types.

The limestones from Cerro La Ceja, Los Coyotes and Cerro La Espina members show large variations in CaCO₃ content (CLC: 58.51 to 95.19%, LC: 64.67 to 98.01%, CLE: 68.99 to 97.46%, respectively) than the Tuape Shale, Cerro La Puerta and Mesa Quemada Members (TS: 82.32 to 88.77%, CLP: 92.28 to 93.82%, MQ: 87.41%, respectively). Large variations in Σ REE content are observed between CLC, TS, LC, CLP, and CLE (21.08 to 73.93 ppm, 35.93 to 113.96 ppm, 5.22 to 108.58 ppm, 10.87 to 13.30 ppm, 2.28 to 52.52 ppm,

34.88 ppm, respectively). The observed variations in Σ REE content may be due to the amount of terrigenous materials in these limestones. The limestone samples of Mural Formation show both negative and positive Ce anomalies (Ce/Ce^* : 0.67 to 1.20). The shale normalized REE patterns of the limestone samples of Mural Formation display seawater like REE pattern, where as some limestone samples exhibit different REE pattern. U/Th, V/Cr and Ni/Co ratios and authigenic U and Mo values were used as geochemical proxies of seawater redox conditions. These geochemical proxies reflect the fluctuation in bottom water oxygenation level which prevailed during the deposition of various limestone units of Mural Formation.