

RARE EARTH ELEMENTS IN PHOSPHATIC DEPOSITS OF PATAGONIA, ARGENTINA

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Concretions from Tertiary phosphate deposits of Gaiman Formation (late Oligocene to early Miocene, Chubut province) and Rio Claro Formation (Paleocene-Eocene, Tierra del Fuego), have been analysed for rare earth elements in order to sustain paleoenvironmental interpretations from former sedimentological work. P₂O₅ content in concretions is between 15% and 22%.

Two types of phosphates are examined in Gaiman Formation: the first belongs to in situ concretions developed within transgressive-early highstand system tracts and the other to reworked and winnowed lags which display a concentration of phosphatic grains, vertebrate bones, teeth and shells. Both types of phosphates show rare earth content similar in the relative abundance of individual elements although they differ in absolute concentration. They also exhibit enrichment in yttrium by a factor between 2 to 30. A typical seawater-like distribution in rare earth elements with a slightly negative Ce anomaly and an enrichment in high rare earth elements in comparison to the average shale from Altschuler is observed. This pattern is consistent with shallow water, inner shelf, marine sedimentation suggested by sedimentological and paleontological evidence.

On the other hand, the studied concretion from Rio Claro Formation belongs to a condensed-type phosphatic bed, product of erosion and reworking. Phosphates are found together with abundant glauconite in the same and closely associated beds. It displays a flat, shale-like distribution with enrichment in La-Ce by a factor of 2, without any enrichment in high rare earth elements. This pattern may be related to in situ precipitation of iron oxyhydroxides derived from alteration of glauconite.