XA0300400

IAEA-CN-80/22P

# PRELIMINARY DATA ON DINOSAURS HABITAT DURING THE UPPER MAASTRICHTIAN, HATEG BASIN, ROMANIA

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The Hateg basin is located in the south-western part of the Transylvanian Depression and it is filled with sediments that overly the crystalline rocks of the Getic nappe. The basin show multiple stage of Mesozoic evolution. The Latest Cretaceous (Middle and Upper Maastrichtian) with continuous transition to Paleocene is represented by two continental lithostratigraphic units: the Densus-Ciula and the Sinpetru Formations. The Upper Maastrichtian of Densus-Ciula Formation at Tustea Quarry is represented by a pebbly alluvium with massive, matrix supported conglomerates, cross bedded sandstones and mudstones, the last one containing calcretes and dinosaur remains, including eggs and hatchlings of the hadrosaurid Telmatosaurus transsylvanicus [1,2].

In order to constrain the paleoenvironment in which dinosaurs lived, calcretes and dinosaur eggshells were analyzed for carbon and oxygen isotopic composition. The standard procedure for carbonate analysis at the Graz laboratory includes $CO_2$ extraction/measurement with Kiel II/Finnigan MAT MS.

The eggshells reveal $\delta^{18}O$ values between 29.5 and 30.5‰ (SMOW) and $\delta^{13}C$ between -13 and -14‰ (PDB). The $\delta^{18}O$ of eggshells are linear related to the $\delta^{18}O$ of water ingested by the species [3,4]. According to the empirical relationship between eggshell and water composition, eggshells with values of 29-30‰ indicate that the $\delta^{18}O$ of water from which the species drunk was around -2‰.

The $\delta^{13}C$ of the eggshell is controlled by the animal's diet but is also strong modified by metabolic fractionation. For example, the $^{13/12}C$ ratio of carbohydrate feeder eggs is 16‰ heavier than the food material [5]. As the measured $\delta^{13}C$ range between -13 and -14‰, the isotopic composition of the food source was around -30‰. This indicate that the main food source consisted of plants with C3 photosynthetic pathways as trees, most shrubs and herbs. The calculated food signatures correspond to the most depleted part of the C3 plants showing that these did not grow under stressed water conditions [6].

The carbon isotopic composition of calcretes is controlled by the composition of $CO_2$ in soils which is further controlled by the proportion of C3 and C4 plants [7,8]. Due to $^{13}CO_2/^{12}CO_2$ differential degassing in soil and the isotopic fractionation between $CO_2$ and carbonate, the total enrichment between carbonates and organic matter vary from 16.5 to 13.5‰ (between 0 and 25°C). As the measured $\delta^{13}C$ values of calcretes, range between -13 and -14‰ they indicate also a C3 source of food with a composition around -30‰.

The oxygen isotopic composition of calcretes are related to temperature and the isotopic composition of soil water which is further related to local meteoric water [9]. The calcret's $\delta^{18}O$ range between 24 and 25‰. For a temperature around 25°C, calcretes precipitated from water with $\delta^{18}O$ around -3‰. Due to processes of evapo-transpirations water form which calcretes precipitated are considered to be enriched relative to rain water. The two source of data (eggshells and calcretes) constrain the source of drinking water to a narrow range probably indicating the limited mobility of the species.

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