INTERNATIONAL ASSOCIATION OF SEDIMENTOLOGISTS
ASSOCIATION DES SÉDIMENTOLOGISTES FRANÇAIS
UNIVERSITÉ D'AIX-MARSEILLE

5th EUROPEAN REGIONAL MEETING
OF
SEDIMENTOLOGY

5e CONGRÈS EUROPÉEN
DE
SÉDIMENTOLOGIE

MARSEILLE 9-11 AVRIL
1984

ABSTRACTS : RÉSUMÉS
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LACUSTRINE SEDIMENTATION (SALINE-ALKALINE) IN THE AUTUNIAN FACIES OF THE IBERIAN RANGE (SPAIN)

The Autunian facies of the Permian in the "Sierra de Aragoncillo" (Iberian Range), begin with a fluvial continental sedimentation composed by breccias, sandstones and shales with a great volcanic influence -acid piroclastic rocks- (lower unit) which gradually changes to shales with intercalated tufts, ashes, volcaniclastic sandstones and dolostones of fluvio-lacustrine environments (middle unit). The top of this sequence is composed by silicified dolostones with sobordinated shales, tufts and ashes, of lacustrine environments (upper unit).

The aim of this paper is for the better understanding of the carbonate and evaporite sedimentation of the upper unit and the diagenetic evolution of these sediments in their reactions with the inter-beded ryolitic tufts and ashes.

++ The dolostones of the upper unit are dolomicrites with a high content of Fe++. The depositional components identified are: Charophytes, Ostracods, sparse vegetable remains, pellets and intraclasts. Other very frequent and abundant components are evaporites as moulds or pseudomorphs. These have a dolomite, calcite, quartz and pyrite composition. The morphology of the pseudomorphs testify to the former presence of anhydrite, gypsum and halite.

The petrographic features of these carbonates are indicative of an early process of dolomitization in a hypersaline environment. The source of magnesium would come from the volcanic rocks that surrounded the closed lacustrine basin. The MgO/CaO ratio in these ryolitic tufts is very high (about 6).

Other common diagenetic products are: Zeolites, quartz and clay minerals. In the Fig. 1 we show the assemblage of these authigenic minerals. Frequently the zeolites are replaced by K-feldspar, quartz, clay minerals, calcite and dolomite. The authigenesis of these minerals are reported to be the result of the reaction of tuffaceous rocks with connate water trapped during sedimentation in a saline-alkaline lake. It looks obvious that these occurrences confirm the existence of a lacustrine sedimentation in arid conditions.

In previous papers the middle unit of Autunian facies had been interpreted as lacustrine deposits in a wet climate. In respect to the upper unit other authors only recognized a change in less wet conditions. We can establish that the lacustrine sedimentation at the end of Autunian took place in a closed basin with arid climate. In this environment a carbonate and evaporitic sedimentation had occurred. Moreover, very important diagenetic reactions between the ryolitic tufts and ashes with the saline brines were produced (Fig. 2).
<table>
<thead>
<tr>
<th>Mineral Type</th>
<th>Upper Unit Description</th>
<th>Middle Unit Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic Matter</td>
<td>Rare (Coal)</td>
<td>Abundants (Coal and Bitumen)</td>
</tr>
<tr>
<td>Vegetable Remains</td>
<td>Sparse and Oxidated</td>
<td>Abundants and Well Preserved</td>
</tr>
<tr>
<td>Carbonates</td>
<td>Abundants (Dolomite, Ankerite, Magnesite)</td>
<td>Sparse (Dolomite, Ankerite, Siderite)</td>
</tr>
<tr>
<td>Evaporites</td>
<td>Abundants (Gypsum, Anhydrite and Halite)</td>
<td>Sparse (Gypsum)</td>
</tr>
<tr>
<td>Zeolites</td>
<td>Abundants (Tanalcime, Clinoptilolite, Phillipsite, Mordenite, Laumontite, Potassium Feldspar)</td>
<td>Rares</td>
</tr>
<tr>
<td>Pyrites</td>
<td>Common (SO$_4$)$^2$ $^2$ $^2$</td>
<td>Common (No Relation to SO$_4^2$)</td>
</tr>
<tr>
<td>Other Autogenic Minerals</td>
<td>Quartz</td>
<td>Anatase, Coffinite, Quartz</td>
</tr>
</tbody>
</table>

**FIG. 1**

![Diagram](diagram1.png)

**FIG. 2**

![Diagram](diagram2.png)