MINERALOGY OF FACIES WEALD IN A STANDARD PROFILE SOUTHWEST OF PEÑAGOLOSA (CASTELLÓN)

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INTRODUCTION

The facies Weald corresponds to the reactivation of the Iberian Rift in the Jurassic-Cretaceous transition and to an important entrance of terrigenous material with installation of extensive deltaic systems (Salas and Martín-Closas, 1991). In this sedimentary environment, tectonics was an important control factor in thickness distribution and in the lithological and mineralogical nature of these materials, which are fundamental characteristics, given the economic interest that these materials arouse as a source of raw materials for the ceramic industry (Jordan *et al.* 1995).

In this work a representative example of the Weald of the marginal areas of the Peñagolosa basin is presented (eastern part of the Aragon Branch of the Iberian Mountain Range), in which special attention is paid to stratigraphic and tectonic control, as a study base, to enable establishing the relation between these factors in a following research stage.

The two lithostratigraphic units studied have been the Castellar Formation and the Camarillas Sandstone Formation (Hauterivian-Barremian). The study area has centred on a band of outcroppings to the SW of Peñagolosa (Castellón). A standard profile has been drawn up (Fig. 1), in which the lutite levels are shown in a systematic way.

METHODOLOGY

The mineralogical study was carried out by X-ray diffraction (XRD) on diffractograms of crystalline powder of the total sample and oriented aggregates of the clay fraction.

For this a Siemens D5000-D diffractometer was used, with graphite monochromator and scintillation detector, Cu-Ka radiation at 40 kV and 30 mA. Diagrams were made from 2 to 60° at 2 θ for the total rock, and from 2 to 45° at 2 θ for the clay fraction, with step intervals of 0.05° and scan times of 3 s. A Socabim EVA software was used for results interpretation as well as G.W. Brindley and G. Brown (1980).

In the material analysis, carbonates were controlled beforehand by calcimetry. At contents exceeding 5%, they were attacked by 10% HCl solution. Subsequently the acid was eliminated by successive centrifuging at 1500 rev. / min. for 15 minutes until achieving neutral pH.

RESULTS

The Castellar Fm presents a mineralogy dominated by quartz, calcite and illite, besides smaller proportions of feldspar and kaolinite (Fig. 2). The Camarillas Fm is made up of quartz and phyllosilicates, and traces of calcite and feldspar. Along the profile, a progressive decrease is observed of the calcite content together with an increase and greater degree of illite and kaolinite crystallinity (Fig. 2).

The Castellar Fm would correspond to pulses of marine influence corroborated by a larger calcite content in its composition. The high illite and kaolinite content, together with a high degree of crystallinity in the Camarillas Fm, indicates that most of the phyllosilicates found are inherited. The presence of these phyllosilicates at lutite levels in the Camarillas Fm conditions its exploitation as a raw material for the ceramic industry.





ma: marl, m: mudstone, w: wackestone, p: packstone g: grainstone, b: boundstone, d: dolomite, l: lutite Af: fine grain sandstone, Am: medium grain sandstone Ag: coarse grain sandstone, Co: conglomerate



 ⊥ Lutite-marly Lutite-marly lithology
Groove crossed stratification

Fig. 1. Base profile of facies Weald in the study zone.



MV-0X=no. of samples; Q=Quartz; Fd=Feldspars; I=Illite; K=Kaolinite; Ca=Calcite

Fig. 2. Diffractograms of total rock of the Castellar Fm. and Camarillas Fm.

CONCLUSIONS

The main considerations drawn from the mineralogical study on the standard profile are:

A progressive decrease is observed in calcite content, as well as an increase and greater degree of crystallinity of illite and kaolinite from the base to the ceiling of the profile.

The origin of the lutites found in Castellar Fm. and Camarillas Fm will have been different, which is corroborated because Castellar Fm. contains a different mineralogical association and degree of crystallinity of the phyllosilicates than Camarillas Fm.

The mineralogical characteristics of the lutites in Camarillas Fm. condition their exploitation as ceramic raw materials.

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