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The reservoir description of the ACG field has also been significantly enhanced by the palynological characterisation of individual intra-reservoir mudstone units. Hence the specific, distinctive and sometimes-unique palynological assemblage characteristics of a particular mudstone, enable us to differentiate between mudstones of limited local extent from those of field-wide lateral extent (important factors for modelling the barriers and baffles to hydrocarbon flow).

This work on the ACG field is ongoing and is part of a multi-disciplinary effort using seismic character, sedimentological core description and petrophysical data to provide realistic parameters for dynamic simulation in sector and full field models. Having established a robust intra-reservoir biozonation the next phase will involve its application in “real time” to assist wellsite operational decision-making.

PALYNOLOGICAL ZONATION, PALEOENVIRONMENTAL AND PALEOCLIMATIC TRENDS FOR THE MIDDLE JURASSIC (LAJAS FORMATION) OF THE NEUQUÉN BASIN, ARGENTINA

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The Neuquén Basin is a back-arc basin, located in the western central part of Argentina. It originated during latest Triassic times and was an important region of sedimentation during the Jurassic and Early Cretaceous. The Cuyo Group (Lower-Middle Jurassic) represents the first major marine depositional episode after the formation of the basin. The study area is located in the southern part of the Neuquén Basin close to Zapala city (38° 48' - 39° 16' S and 70° 03' - 70° 06' W) and comprises four sections (Lohan Mahuida, Puente Picún Leufú, Puesto Bascuñán and Portada Covunco). In the Cuyo Group, the Lajas Formation consists of sand-rich shallow marine deposits (late Aalenian – early Callovian). From the sequence stratigraphic and biostratigraphic studies (mainly ammonites) three third-order depositional sequences (JC4, JC5 and JC6) and five 4th order sequences (JC4.1 to JC4.5) has been recognized in this formation. The objective of the present study is to analyze the palynological organic matter (palynomorphs, phytoclasts and amorphous organic matter) of 37 outcrop samples belonging to the Lajas Formation.

Taking into account the first appearance datum (FADs) and taxon ranges of characteristic species, a palynological zonation is proposed. Two zones and eight subzones based on sporomorphs and associated microplankton are defined.

The *Callialasporites* “complex” Zone (Late Aalenian – Middle Early Bajocian) is characterized by the presence of *Callialasporites dampieri*, *C. microvelatus*, *C. segmentatus*, *C. turbatus* and *C. trilobatus* up to FAD of trisaccate forms (genus *Microcachryidites*). It comprises five subzones: (1) *Callialasporites trilobatus* Subzone (presence of *C. trilobatus* up to FAD of *Antulsporites saevus*); (2) *Antulsporites saevus* Subzone (FAD of *A. saevus*, *Callialasporites dampieri*, *C. microvelatus* and *C. segmentatus* to FAD of spores belonging to the genera *Ischyosporites* and *Klukisporites* genus, such as *Klukisporites labiatus*); (3) *Klukisporites labiatus* Subzone (FAD of foveolate spores assigned to the genera *Ischyosporites* and *Klukisporites*, such as *K. labiatus* to FAD of *Interulobites variabilis*); (4) *Interulobites variabilis* Subzone (FAD of *I. variabilis* to FAD of *Uvaesporites minimus*); and (5) *Uvaesporites minimus* Subzone (FAD of *U. minimus* to FAD of *Neoraistrickia truncata* and/or trisaccate pollen of the genus *Microcachryidites*).

The *Microcachryidites* Zone (Middle Early Bajocian – Early Callovian), beginning with

the FAD of trisaccate forms of *Microcachryidites*. This zone is characterized by the gradual replacement of monosaccate pollen (*Callialasporites* "complex") by trisaccate pollen. It comprises three subzones: (1) *Neoraistrickia truncata* Subzone comprising the total range of spores of the genus *Neoraistrickia*; the FAD of trisaccate grains of the genus *Microcachryidites* indicate the base of this subzone; (2) *Microcachryidites castellanosii* Subzone (FAD of *M. castellanosii* to FAD of *Taurocusporites quattrocchiensis* and *Interulobites lajensis*); and (3) *Taurocusporites quattrocchiensis* Subzone (total range of *T. quattrocchiensis* and *I. lajensis*).

Based on the relative frequency fluctuations of plant families the existence of a warm and humid climate with a relative deterioration to temperate and sub-humic conditions are inferred. These latter pulses correspond to the Early Bajocian (JC4.2-TST until JC4.4-TST, with a maximum deterioration in JC4.3-TST) and in the Bathonian – Callovian limit (JC5-TST). Palynofacies analyses suggest a nearshore, well-oxygenated high-energy environment (with tide and wave action) proximal to the continental sediment supply.

EARLY ANGIOSPERMS POLLEN FROM THE CRETACEOUS OF MEXICO (MERIDIONAL LAURASIA): PALEOGEOGRAPHIC AND CHRONOSTRATIGRAPHIC SIGNIFICANCE

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A palynologic survey of early angiosperms in Mexican territory has been initiated in order to assign ages to certain lithostratigraphic units.

The genus *Afropollis* sp. has been recovered from the Tepalcatepec Formation in Colima and Michoacán states. Previously *Afropollis* species have been reported from the Oaxaca state. These findings suggest the influence of the northern Gondwana flora (ASA) in southern Mexico.

In the Tlayúa Formation (Puebla state), there is a distinct horizon that yields a rich assemblage of *Retimonocolpites* sp., *Asteropollis* sp. and *Lethosamites* sp. These taxa, together with the presence of the Normapolles group, help to constrain the age of the Tlayúa Formation to the lowermost Cenomanian.

At Durango state, in northern Mexico, a package of black slates and limestone, known as the Gran Tesoro Formation, contains abundant cheirolepidaceous pollen, and scarce *Tricolpites* and *Jugella* species supporting an Early Cretaceous age (Albian) for this unit.

In general, the Early Cretaceous palynoflora of Mexico have a distinctive Laurasian affinity with an admixture of Gondwana taxa in the south.