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SPAIN

15th INTERNATIONAL SEDIMENTOLOGICAL CONGRESS

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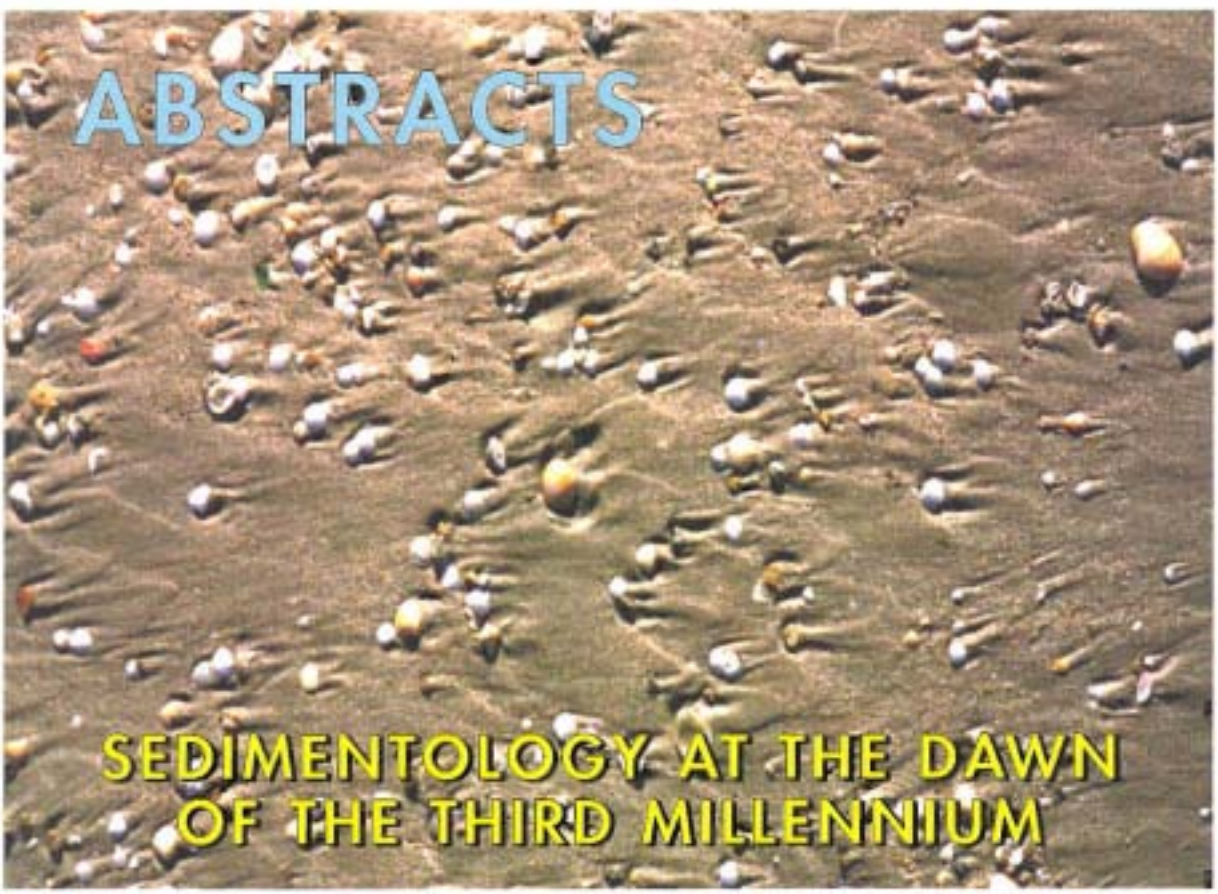

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Abstracts

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SCIENTIFIC PROGRAMME ACCORDING TO SESSIONS

THEMES

THEMES A. ANALYTIC TECHNIQUES. DATA PROCESSING AND REPRESENTATION

THEME G. GEOLOGY AND OCEANOGRAPHY OF CONTINENTAL MARGINS

coast, to pelagic sediments. Existing evidence indicates that a prolonged phase of erosion in the pelagic realm, is responsible for hampering sedimentation and sculpturing the surface. Such submarine erosion, however might have wiped out all the clues of a phase of emersion, proceeding the drowning. Only submarine erosional features in both sequences of events would be preserved. The renewal of the sedimentation would be mainly controlled by the energy af the currents, current activity slowing down and eventually being stopped with increasing depth. The age of the first pelagites over the discontinuity surface vary from place to place. It can be suggested that, on an irregular seafloor, the more elevated parts were affected by current activity, strong enough to locally erode previously deposited sediments, or to totally hinder sediment accumulation for longer time spans than in the lower parts.

The analysis of the location of the areas with emergence evidence, their position in the palaeogeographic reconstructions and the precise dating of the related sedimentary rocks allow us to establish a genetic model, based on real cases observed in the Subbetic. Several phases of palaeokarst development were superposed in the same place. Detailed mapping of the region has made it possible to recognize differences in the degree of karstification across the various tilted blocks. The highest part of emerged blocks were preferentially karstified, with the degree of dissolution decreasing down. Whereas some blocks remained exposed until the Upper Cretaceous, others were exposed for short periods of time and relatively lightly karstified. In the former example, extensive cavern development took place. As a general rule, such palaeokarst systems were of relatively local extension, capping individual tilted-blocks. and very important differences in karst development appear between neighbouring areas.

The pelagic filling of the karstic cavities allow us to date the karstification process and to distinguish the different phases of the karstification and filling processes. The superposition of different phases makes a complex network of neptunian dykes with diverse ages and infill types. In the Subbetic, between the Pliensbachian and the Maastrichtian (about 120 Ma), these phenomena have been recurred in different sectors of the basin and in different ages. The presented model is applied to those cases where two, at least, emergence and karstification phases coincide in the same place, and they were separated by a time span with pelagic, but not necessarily deep, sedimentation. The analysis and precise dating of the sediments filling the cavities, allow us to reconstruct the complex sedimentary history of every sector of the basin. Only the integration of the conclusions coming from the study of many different outcrops makes it possible to arrive at a proper hypothesis about the genesis of the cavities. Tectonic and eustatic sea level fluctuations were the two main factors causing fault-block emersion. Relative sea level lowstand, locally with fault-block emersion, were followed by relative sea-level highstand and the renewal of the sedimentation. The detailed analysis of the palaeokarst correlative paraconformity surfaces, allow us to be precise about the position in time of the events contralling the genesis of all these phenomena.

The analysed carbonate sequences show multiple phases of karstification and appreciation of this should prove useful in interpreting complex palaeokarst systems. Such phases may be multiple, and they may result in discrete palaeokarst features, whereas others overprint earlier phases. Each successive karstic process modified earlier features and was also guided by them, and this interdependence complicates any attempt to isolate the individual karst events.

SOURCE AREA VERSUS DETRITAL PRODUCTS: A GEOGRAPHICAL INFORMATION SYSTEM APPROACH

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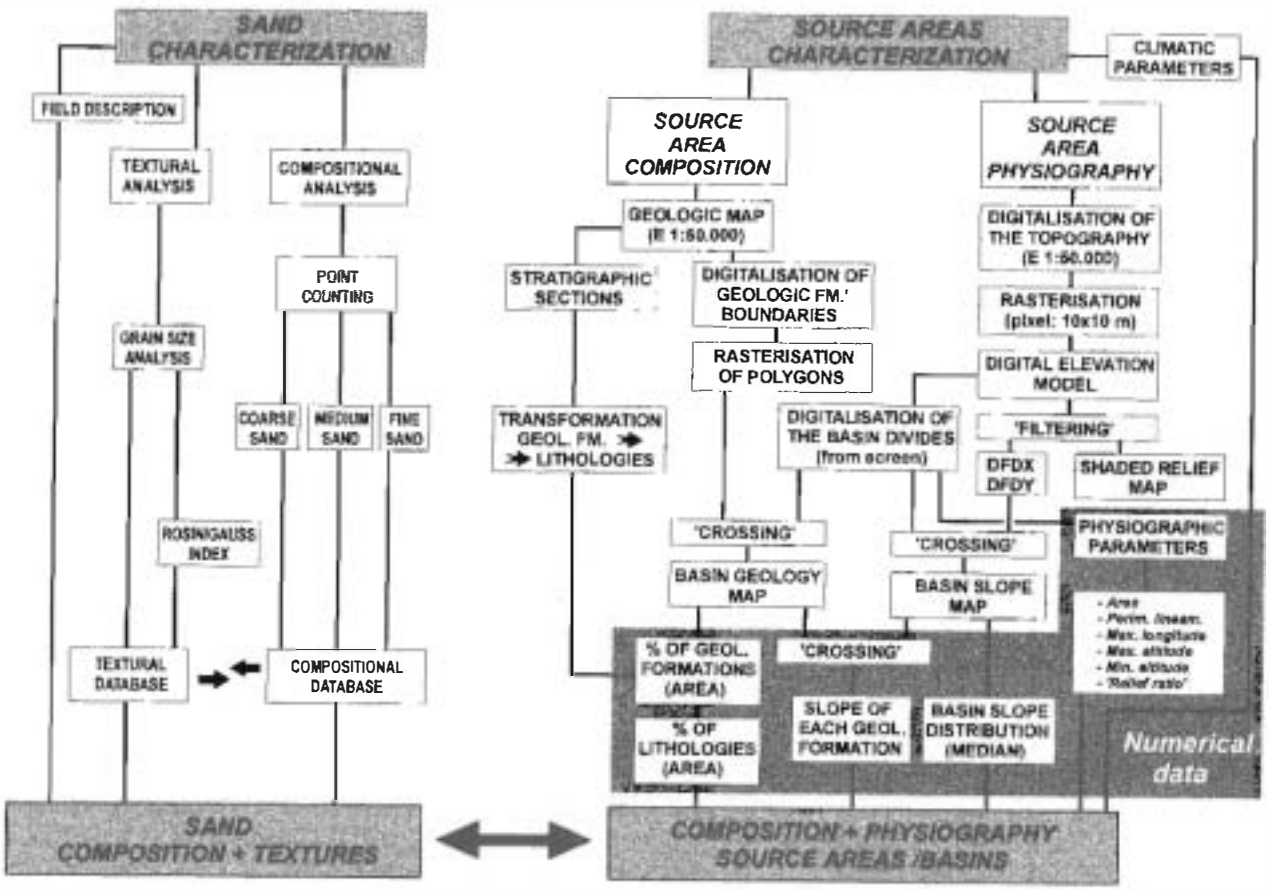
Several studies on the origin of detrital sediments based on comparative sedimentology with modern deposits have been developed during the last thirty years and interesting results have been achieved. The great advance in the understanding of the genesis of these deposits is related to the direct observation of the processes involved in clastic generation. The observation and quantification of the characteristics of both producers (source area) and products (sediments) may lead to answer many questions about factors and mechanisms controlling textures and composition of clastic sediments. This actualistic approach ollows the reconstruction of the history of a sediment from its source area to its deposition site, being the ultimate aim of these studies establishing predictable models applicable to ancient deposits.

A constraint in the present studies on the origin of sediments is the difficulty to obtain detailed information about the physiography of the sediments' source area to determine its influence on the type and quantity of the sediments generated. Geographical Information Systems (GIS) showed to be a powerful and agile tool in quantification and contrasting of parameters related to the drainage areas.

A geographical information system (ILWIS V. 1.41) was employed to develop a methodology that characterised the source of sand-sized sediments generated from Mesozoic sedimentary rocks in the Iberian Range (Spain) (see also Arribas et al. at this meeting). This methodology is based on the contrast of data from sediments with their corresponding source areas (Fig.



1). The textural and compositional analysis of the sediments is performed using classical petrography techniques: grain size analysis ond modal composition analysis of three sand-size fractions. Thus, a PETROLOGIC DATABASE of the sediments is produced. The characterisation of the source area of the sediments required the combination of geological and physiographical parameters to establish a new database.

Topographic maps (scale 1:50.000) of the drainage areas were digitised to generate vector maps that were rasterised with a pixel size of 10x10 m. A linear interpolation was performed on the rasterised isolines maps, to produce a digital elevation model (DEM), which allowed to delimitate the precise boundaries of the drainage basins following their watershed. Moreover, basic topographic parameters of the drainage basins, like total surface, max. and min. altitude and perimeter lineament, could be obtained from the DEM. A slope map was also calculated applying two gradient filters (DFDX and DFDY). Thus, the filtered map contains a slope value in percentage for each pixel. A statistical analysis of the distribution of these values (mean) throughout the entire drainage area pravided a real physiographic parameter about the gradient of the slopes. The geological information about the drainage basins was transformed into a raster format by digitising the geological maps, which, afterwards, were combined with the basin perimeter to obtain the area occupied by each geological formation in the drainage basin. Similarly, the combination of geological raster maps and slope maps generated information about the outcropping conditions of the cartographic units. Finally, the elaboration of numerical tables provided a database that describes the physiography and geology of the drainage basins.

These data could be easily contrasted with the petrologic database, demonstrating the significant contribution that geographical information systems offer to the understanding of the genesis of modern sediments.

CONTRASTING DIAGENETIC STYLES IN BRAZILIAN PASSIVE-MARGIN TURBIDITIC RESERVOIRS

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Turbiditic sondstones ore the most importont reservoirs in the Brazilian offshore basins. Most of these sands were deposited in submorine canyons, intra-slope ond boseof-slope basins (Figure 1) by high-density turbidity currents, which