characterized by upslope prograding high-amplitude reflections, where some strong internal reflections can be followed regionally. This section onlaps the Eocene slope and was probably deposited from the Oligocene to the upper Miocene. The upper section, deposited from the upper Miocene to Recent, is marked by fainter continuous reflections often intermingled with chaotic packages. This section is characterized by an aggradational style, usually associated to standing sediment waves. We interpreted this Neogene section as being the result of a dominant oceanic condition in the Santos Basin after an Eocene tectonic crisis, which restrained the continental source of sediments to the adjacent Campos Basin. Local reactivation of deep-seated faults modified the submarine physiography, triggered mass movements and provided passageways where the strong Neogene bottom currents would have been enhanced. External drift geometry, internal seismic reflection pattern and erosional features suggest the predominant action of a southerly current as the ultimate responsible for the Neogene sediment accumulation and shaping the present Santos Basin continental margin.

64-13 Poster Lima, Jose

HYDRODYNAMIC MODELING OF BOTTOM-CURRENT SEDIMENT TRANSPORT IN THE CANYON SAO TOME (BRAZIL)

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Keywords: hydrodynamics; modeling; turbidity; contourites

This study presents the hydrodynamic modeling of ocean currents along the Canyon Sao Tome, Campos Basin, Brazil, and their interaction with sediment transport. The objective of this modeling is to develop a tool to simulate the interaction between bottom currents and the submarine physiography, and to depict the relative importance of any individual current forcing mechanism as a sediment-reworking agent. Also, interaction between oceanic currents and turbidity current can be simulated in order to better understand the relative impact of each process in developing deep-water coarse-grained accumulations, which are of fundamental importance as hydrocarbon reservoir. Deep-water deposits contain variable proportion of sand and clay based sediments, as a function of the available sources on the canyon head and the dynamic characteristics of the currents along it. This paper presents the evolution of along channel currents over a tidal cycle and the simulation of a turbidity current. The resultant sediment transport under the combination of turbidity and oceanic currents is presented. This model is a step forward is the task of understanding the geometric and textural modifications imposed by bottom currents upon gravity-driven deposits, which is of relevant importance for the oil industry.

64-14 Poster Viana, Adriano

SEISMIC RECOGNITION OF UPPER SLOPE CONTOURITIC SANDS, MIDDLE/UPPER MIOCENE, CAMPOS BASIN, BRAZIL

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Keywords: contourites; upper slope sands; Miocene; Campos Basin

Upper slope sand deposits constitute large elongate accumulations of coarse to very fine sand resulting from the action of slope boundary currents upon shelf derived sediments. Linear sediment supply is yielded by shelf sediment overspill resultant from the action of different forcing mechanisms: tides, storm fronts, geostrophic currents onshelf penetrations as meanders and eddies, which provokes the 'sea-floor polishing effect', the rotatory sweeping of the sea-bed by mesoscale eddies. On the slope, the sediment is redistributed along the isobaths by slope boundary currents. This model was described based on the modern characteristics of Campos Basin margin, where coarse-grained sediments (pebbles to very coarse sand) are found below the zone of maximum current acceleration (Brazil Current), which locally crosscuts the shelf edge before re-entering over the slope. Downstream, fining is observed as a consequence of the morphologic controlled BC deceleration. The resultant deposit is an elongate (~ 70km long) and sheeted to thinly wedged (up to 50m thick) deposit. The excellent quality of industrial 3D seismic data provided the opportunity seismically calibrate that model and to identify its geologic record. This paper presents the recognition of the seismic record of upper slope sand deposition under similar geologic conditions during the middle to upper Miocene in Campos Basin. Paleogeographic reconstructions with the identification of the paleo-shelf break and the upper slope fundamentally helped to constrain the physiographic setting where some intriguing seismic anomalies were identified. These anomalies are characterised by 10's km along the slope and a few km downslope sheet to multi-linear high amplitude features, developed upon an uppermost erosional terrace. Salt-cored antithetic faults, parallel to slightly oblique to the isobaths seem to have modified the relief contemporaneously to the sand deposition under the slope boundary action. Two main depositional areas are observed: one, close to the shelf edge, marked by sheet like structures, with fainter amplitudes; another, downslope, anchored by the listric faults, where ribbon like structures with higher amplitude anomalies were developed. Boreholes and well logging in adjacent wells tied to the seismic data corroborate the presence of sands and validate the model. These observations enlarge the importance of bottom current deposits as potential exploration targets.

64-15 Poster Moraes, Marco

BOTTOM-CURRENT REWORKED PALEOCENE-EOCENE RESERVOIRS OF CAMPOS BASIN, BRAZIL

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Keywords: contourite; turbidite; Campos Basin; Paleocene; Eocene

Deep-water reservoirs consisting of turbiditic sandstones moderately to heavily reworked by bottom currents are common in canyon- and trough-filling Paleocene-Eocene sequences of Campos Basin, offshore southeastern Brazil. Hundreds of wells with conventional logs, several with cores and image logs, provide the data base for the study of these rocks. Seismic data provide additional support, but low resolution and noise hampers detailed analysis. The sandstones presenting better reservoir quality in these sequences are interpreted as emplaced by high-density turbidity currents, as suggested by the dominance of unstratified normally-graded sandstones, with grain sizes ranging from fine to coarse sand, and low clay-matrix content. Sandstones interpreted as bottom-current deposits form poor-quality reservoirs. These rocks are commonly moderately to heavily bioturbated, showing variable (frequently high) clay-matrix content. Common trace fossils include Planolites, Paleophycus and Zoophycus. Locally, bioturbated sandstones show faint to well-marked horizontal and planar-cross stratification. Bottom-current sandstones with thickness ranging from a few decimeters to several tens of meters occur intercalated with turbiditic sandstones. The examples presented herein are mostly from base-of-slope settings. However, occurrences in middle- to upper-slope settings are also documented, showing increasing proportion of bioturbated and stratified sandstones toward shallower regions. Since they present distinct reservoir quality, the mapping of the limits between turbiditic and bottom-current sandstones is critical for adequate reservoir characterization. To date, most of this mapping has been performed using well information. However, recent application of seismic attributes analysis is increasing reservoir visualization and hence the definition of depositional geometry. The currents responsible for reworking turbiditic sands are interpreted to be deep tidal currents, with velocity enhanced in narrow canyons and troughs. Such interpretation, which is consistent with the overall geometry of the sand-bodies, which are commonly aligned transversally to the slope, is still quite speculative. New studies being performed on seismic geometry and paleo-oceanography will permit a more complete assessment of the origin of these important reservoir sequences.

64-16 Poster Mahiques, Michel

SEDIMENTARY RECORD OF THE PALEOCEANOGRAPHIC EVENTS IN THE COLUMBIA CHANNEL-LEVEE SYSTEM (SOUTH BRAZILIAN BASIN)

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Keywords: COLUMBIA CHANNEL-LEVEE SYSTEM; SOUTH BRAZILIAN BASIN; PALEOCEANOGRAPHIC EVENTS

The Columbia channel-levee system is located in the northern part of the SE Brazil basin where the Antarctic Bottom Water (AABW) flows northward, at depths below 4000m. The evolution of the system during the Neogene, supported by 1,614 km of water-gun seismic lines, has been studied, focusing on the role played by the paleoceanographic events. Stratigraphic interpretations of the data are made from correlations with data of the Deep-Sea Drilling Project, site 515, located in the south of the SE Brazilian Basin.The Columbia system was built in three distinct phases. Phase 1 (upper Cretaceous?-Paleocene) consists of pelagic-hemipelagic sedimentation and turbiditic sedimentation. In that time, the ocean had two layers, one deeper with warm and salty waters formed in the low latitudes, and a second shallower with colder waters formed in the high latitudes. The basin was smaller than nowadays and no deep circulation occurred. This phase ended with an erosive discordance (D1: Paleocene-Eocene) due to strong bottom currents related to global tectonic movements known in the North Atlantic, Pacific and Indian oceans. Phase 2 (middle-lower Eocene) is characterised by distal-sheet turbidites in a basin with characteristics similar to those of the prior phase. It is bounded by a major erosive discordance (D2: upper Eocene-Oligocene) that corresponds to the initiation of strong AABW deep currents well-recorded in the Brazilian basin and all along the western Atlantic margins. Phase 3 (upper Oligocene-Recent) corresponds to the development of the "modern" system that is still active. Two predominant sedimentary processes are interactive: turbidity currents transported along and overflowing the Columbia channel, and the contour currents linked to the AABW flow. At that time the termohaline circulation was very active and the three discontinuities recorded in the deposits (D3, D4 and D5) resulted from the variations in the flux of the AABW. These three discontinuities: D3 middle-lower Miocene; D4 middle-upper Miocene; D5 Pliocene?; could be correlated with discontinuities already observed in the south Brazilian basin and others oceanic margins like the eastern north american margins.

64-17 Poster Sivkov, Vadim

NEW DATA ON DEEP-CURRENT CONTROLLED SEDIMENTARY SYSTEM IN THE VEMA CHANNEL AREA

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Keywords: the Vema Channel; contourites; warming of the AABW; suspended matter; Ewing drift

The Vema Channel is the only deep and the best-studied passage through the Rio Grande Rise, which connects the Argentina and Brazil basins and allows the northward flow of AABW beneath the southward flowing NADW.In November 2003, three transversal CTD sections and a one CTD-section along the channel were carried out from R/V "Akademik Sergey Vavilov", and new data on deep-current controlled sedimentary system were obtained within the national "Meridian" program. The cold core of the AABW flow was displaced to the eastern slope of the channel due to the Ekman friction. Further warming of this water caused by global warming was confirmed. In addition, the temperature gradually increased from south to north.Multibeam echosounder ECHOS XD and high-resolution parametric profiler PARASOUND with penetration up to 100 m were used to survey the bottom topography and structure of sedimentary cover. This allowed us to study the nature of sediments and the sub-recent environment conditions. Contourite deposits were recorded. In addition to significant erosion and scouring of the channel floor, irregular discontinuous sediment bodies are deposited on the floor and flanks of the channel, as patch drifts or channel-moat related drifts. Near the outflow of AABW from the channel, a contourite fan was found. A very high concentration of suspended matter (greater than 500 ppm) was found in the bottom layer over this fan up to 2500 m. Suspended matter concentrations in the Vema Channel are high and turbid water layers alternate with layers of relatively low concentration.Giant elongate-mounded Ewing drift in the Argentine Basin near the inflow of AABW to the Vema Channel was recorded. Increased concentration of suspended matter was found over this drift as well as over the contourite fan. Maximal concentration of suspension in the bottom layer (greater than 600 ppm) related to the core of the western boundary Antarctic bottom current was found southward of the Ewing drift at 36°S.

64-18 Poster Hanquiez, Vincent

THE GULF OF CADIZ: THE GIANT CONTOURITIC LEVEE AND THE CONTOURITIC LOBES

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Keywords: Gulf of Cadiz; Mediterranean Outflow Water; contour current; sedimentary bedforms; instabilities

The Gulf of Cadiz is located in the eastern part of the North Atlantic Ocean, close to the Strait of Gibraltar. At present, the oceanic circulation in the Gulf of Cadiz

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is controlled by water fluxes between the Atlantic Ocean and the Mediterranean Sea including an intermediate current, the Atlantic inflow, and an energetic bottom current, the Mediterranean Outflow Water (MOW). The sedimentation on the Iberian and Portuguese continental slopes results from the activity of this warm (13 C) and saline (36.5 ‰) MOW. Just passed the Strait of Gibraltar westward, the MOW captures the particles that are carried by Spanish rivers and transported toward the strait by along-shelf shallow hydrodynamic processes. These particles are redistributed along the slope by the MOW. In the more distal part of Gibraltar, the high MOW velocity (> 2.5 m/s) forms a coarse-grained lag deposit (gravels to sands). Both the velocity and competence of the MOW decrease along the pathway. This leads to the formation of varied sedimentary bedforms and the construction of fine-grained contourite drifts. Off the Cape San Vicente, the low velocity (< 0.1 m/s) reduces the competence of the MOW and only silty-clays are transported here. New high resolution acoustic data (EM 300 and SAR) were collected during the CADISAR cruise in August 2001 on the R/V "Le Suroit" in an area located between 35°35' N / 36°40' N and 6°35' W / 8°20' W, at water depths ranging from 600 m to 1900 m. These data allow a better understanding of the flows dynamic in this area, and improve the recognition and mapping of sedimentary bedforms. The study area includes also the divergence zone between a geostrophic along-slope current (upper MOW core) and an ageostrophic downslope current (lower MOW core). Before this divergence, the flow spills over a giant contourite levee. After the divergence, the two cores can be channelled by major or minor NNE/SSW submarines valleys. One of these valleys, the Gil Eanes channel, is longer than 40 km and wider than 2.5 km to 1 km in its eastern and western parts, respectively. The existence of overspread instabilities on the north side of the Gil Eanes channel, sediment waves along its floor and of small sandy lobes at its mouth are morphologic convergences with channel-levee complexes formed by turbidity current activity. However, the major difference is that here, the main process for particle transport is an energetic contour current.

64-19 Poster Hanquiez, Vincent

AN UNUSUAL SEDIMENTARY SYSTEM: THE GIL EANES CHANNEL, GULF OF CADIZ

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Keywords: Gulf of Cadiz; Mediterranean Outflow Water; contouritic channel-levee complex; sandy lobe

The Gulf of Cadiz is located in the eastern part of the North Atlantic Ocean, close to the Strait of Gibraltar. The Gulf of Cadiz undergoes the influence of a strong, warm, and saline current called the Mediterranean Outflow Water (MOW). The MOW comes out of the Mediterranean and spreads in the North Atlantic at water depths ranging from 600 to 1300 m. At present, the MOW controls the sedimentation on the Iberian and Portuguese continental slopes. Westward of the Strait of Gibraltar, the MOW captures the particles that are supplied by Spanish rivers and from the shelf. The sedimentary features observed downflow from Gibraltar show the progressive decrease of the MOW energy. Close to Gibraltar, the high MOW velocity (> 2.5 m/s) forms a coarse-grained lag deposit (gravels to sand). Conversely, around the Cape San Vicente, the deposits associated to this current are fine-grained sediments (silts to clays), due to the low velocity of the MOW (< 1 m/s). A new high resolution data set from the EM 300 multibeam echosounder, deep-towed sonar SAR, Chirp and Sparker profiles, and piston cores were collected during the CADISAR cruise in 2001, in an area located between 35°35' N / 36°40' N and 6°35' W / 8°20' W, at water depths ranging from 600 m to 1900 m. In this area, due to the sea-floor morphology, a part of the MOW is deflected southward and is channelled by major or minor downslope submarines valleys. One of these valleys, the Gil Eanes channel, formed probably by retrogressive erosion, is longer than 40 km and wider than 2.5 km to 1 km in its eastern and western parts, respectively. It is a primary conduit for sand transport towards the slope and deep basin as attested by sandy sediment waves along its course and small sandy lobes at its outlet. These lobes are formed by the stack of several depositional events. They can form due to the expansion of three depositional processes: the channelled MOW, debris flows or turbidity currents. Overspread instabilities characterized the north side of the Gil Eanes channel. These instabilities affect also the top of the flanks of the Gil Eanes. This suggests that a recent sedimentation due to flow spilling occurs here. These observations suggest similarities between the Gulf of Cadiz and classical deep-sea channel-levee complexes formed by turbidity current activity. However, in the Gulf of Cadiz, the main process for particle transport and deposit is an energetic contour current.

64-20 Poster Hernandez Molina, Francisco Javier

CONTOURITE DEPOSITS RELATED TO THE UPPER CORE OF THE MEDITERRANEAN OUTFLOW WATER IN THE GULF OF CADIZ

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Keywords: Gulf of Cadiz; Continental slope; Mediterranean Outflow Water; Contourite Deposits; Seismic Stratigraphy

Several studies have been based on the description of contourite sedimentation along the northern margin of the Gulf of Cadiz. These studies have mainly focussed on the Faro drift, which developed on the middle slope under the influence of the Mediterranean Outflow Water (MOW). Recently, a detailed morphologic and stratigraphic research programme has been carried out over a broader region of the middle slope with new bathymetric and seismic reflection profile data. This study has allowed us to identify new types of contourite drifts between the middle and upper slope. Four main different contourite deposits have been characterized related to the upper core of the MOW, which are from SE to NW: a) A mixed drift located in the southeastern area, composed of sheeted drift alternating with mounded and separated drift. b) A plastered drift located between the middle slope and the distal part of the upper slope, between the mixed drift and the mounded and separated Faro-Albufeira drift. These deposits are characterized by an aggradational stacking pattern and lens shape. c) The elongate mounded and separated drift of Faro-Albufeira, which is bounded against the upper slope by the Alvarez Cabral Moat. These deposits have a sigmoid progradational stacking pattern migrating upslope, with lenticular convex-upward depositional units overlying major erosive discontinuities. d) Sheeted drift deposits. The sedimentary facies of the mixed, plastered and mounded drifts change laterally seaward to sheeted drift facies. They are also identified in the western area between Albufeira and San Vicente Cape. These deposits comprise layers of more or less constant thickness with aggradational stacking pattern.The occurrence of these different contourite deposits are directly related to the changes in the Upper Mediterranean Outflow Water Core (MU), which flows as a laminar water mass in the southeastern area until the Faro-Albufeira area, where a more turbulent core generates the mounded drift. The MU water mass returns to more laminar behaviour between Albufeira and San Vicente Cape area. The major Quaternary stratigraphic changes identified in the various drifts are indicative of paleoceanographic changes of the MU, controlled by climatic and eustatic variability, local tectonic changes (especially movements of diapiric bodies) and variation in sediment supply.This work was supported by the projects CICYT MAR-98-02-0209 (TASYO), REN2002-04117-C03-01 (GADES) and IGCP-432.

64-21 Poster Hernandez Molina, Francisco Javier

THE CONTOURITE DEPOSITIONAL SYSTEMS OF THE MIDDLE SLOPE OF THE GULF OF CADIZ

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Keywords: Gulf of Cadiz; Contourites deposits; Morphology; Sedimentology; Seismic Stratigraphy

A detailed study of the Contourite Depositional System (CDS) of the Gulf of Cadiz has been carried out using a broad database collected since 1989, obtained during several cruises and projects supported by the Spanish Research Council and the US Research Loboratory. The database we used includes: a) bathymetric data; b) side-scan sonar imagery; c) seismic reflection data from low-resolution MCS profiles, medium-resolution seismic profiles from Sparker and Airgun systems, high-resolution seismic profiles using Geopulse and 3.5-kHz systems, and ultra-high resolution seismic profiles using TOPAS system; and d) sediment core data. These data have enabled us to draw up a regional morphology and stratigraphic stacking pattern of the Quaternary deposits of the upper and middle slope, identifying key discontinuities, evolution of the sedimentary processes involved, and documenting the principal paleoceanographic changes.The CDS of the Gulf of Cadiz is composed of both depositional and erosive features. The main depositional features are characterized by sedimentary waves fields, sedimentary lobes, mixed drifts, plastered drifts, elongate mounded and separated drifts and sheeted drifts. The main erosive features are contourite channels, furrows, marginal valleys, and moats. Both depositional and erosive features are essential to understand the regional interaction of the Mediterranean Outflow Water (MOW) with the middle slope. The interplay between climatic, eustatic and tectonic controls has determined the genesis and evolution of the CDS.Although the Gulf of Cadiz slope region has been influenced by both downslope and alongslope processes, there appears to be a marked separation between the two. Contourite processes of the CDS are dominant on the middle slope, whereas downslope processes dominate the lower slope and continental rise. For the most part, these processes appear not interact simultaneously, as has been found common along other margins (eg the North Atlantic margin model).This work was supported by the projects CICYT MAR-98-02-0209 (TASYO), REN2002-04117-C03-01 (GADES) and IGCP-432.

64-22 Poster Veiga-Pires, Cristina Carvalho

STUDYING THE PAST OF MEDITERRANEAN OUTFLOW BASED ON 230TH EXCESS INVENTORIES AND CONTOURITES

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Keywords: thorium 230; contourites; paleoceanography; MOW

The Mediterranean Outflow water (MOW) comes out from the Mediterranean Sea and then contours the northern slope of the Cadiz Gulf. Along its way to the southern Portuguese Margin, it divides itself into three levels flowing at different depths, 400 m, 800 m and 1200 m, respectively. These different pathways induce a series of contourites along the Cadiz slope as well as some sedimentary drifts, such as the Faro Drift. Based on the assumption that the sedimentologic characteristics of these contourites should give some light on the history of MOW velocity and intensity variability, two long sedimentary cores collected during the Marion Dufresnes 114/Images cruise in 1999 have been studied. The sampling sites of these two cores, MD99-2336 and MD99-2339, located in the Cadiz Gulf at 690 and 1177 m water column depths respectively, are thus, actually, below the first level and in the main core of the MOW third level. Along time, variations in these current levels, parallel to the slope, should then influence the existence and characteristics of contourites in both sedimentary records. For this purpose, thorium-230 (230Th) as well as granulometric and micropaleontologic analysis have been undergone at high resolution on the 4 uppermost meters spanning MIS1 to LGM times. The referred current prints can be detected by analysing surface and down core sediment for its 230Th content. This radioisotope is produced by the radioactive decay of uranium-234 which content in oceanic waters is known. Therefore, its production rate in the water column can be estimated as a linear function of the water depth (~ 2.6 dpm/cm2.ka for 1 km water depth). As 230Th is almost insoluble, it will sink to the oceanic floor together with the settling particles. This vertical flux to the underlying sediment is considered, in a first order approximation, equal to its production rate in the water column. On this basis, the 230Th excess in the sediment becomes a proxy for sedimentation versus erosion processes accordingly to the sign of the difference between the total and the vertical 230Th flux, i.e. if it is, respectively, positive or negative. With this method it is then possible to extrapolate on the location of the high velocity core area and whether its intensity changed or not looking at the inventory of excess 230Th in the contourite units. We acknowledge FEDER and OE that financed this study through the Portuguese Foundation for Science and Technology (PDCTM/PP/MAR/15297/1999).

64-23 Poster Van Rooij, David

SMALL MOUNDED CONTOURITE DRIFTS ASSOCIATED WITH CORAL BANKS, PORCUPINE SEABIGHT, NE ATLANTIC OCEAN

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Keywords: Deep-water corals; Contourite; Seismic stratigraphy; British-Irish Ice Sheet; Heinrich Events

Numerous investigations on contourite drift systems have demonstrated they are dependant of a close interaction of topography, oceanography, sediment supply and climate. Most of these contourites have been reported in areas along the ocean margins directly influenced by the large oceanographic deep-water currents from the global conveyor belt. Here, we report on smaller-scale

THE GULF OF CADIZ:
THE GIANT CONTOURITIC LEVEE AND THE CONTOURITIC LOBES

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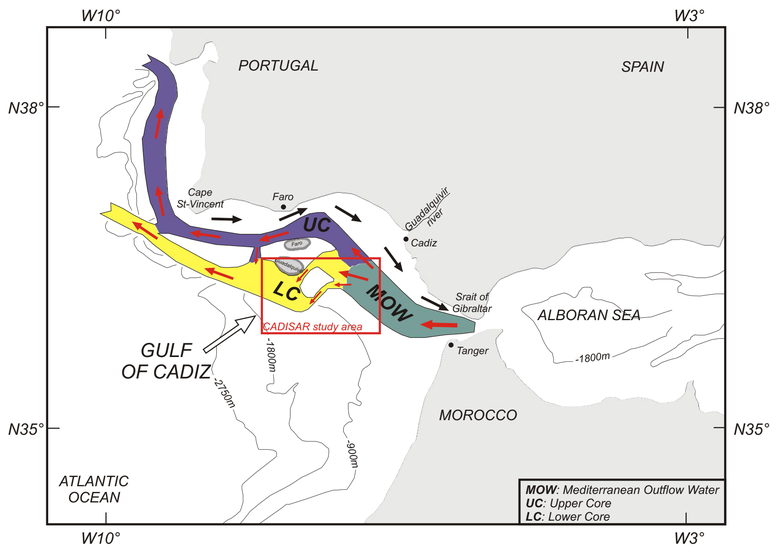

Figure 1: localisation and system of currents in the Gulf of Cadiz.

The Gulf of Cadiz (*figure 1*) is located in the eastern part of the Atlantic Ocean, between the African and Eurasian plates. It spreads of the Strait of Gibraltar (Spain) as far as Cape St-Vincent (Portugal) with an orientation NW/SE.

At present, circulation on the Gulf of Cadiz margin is controlled by the exchanges between the Atlantic inflow (black arrows, *figure 1*) and a permanent flow of deep water flowing of the Mediterranean Sea towards the Atlantic Ocean called Mediterranean Outflow Water (MOW; red arrows, *figure 1)*.

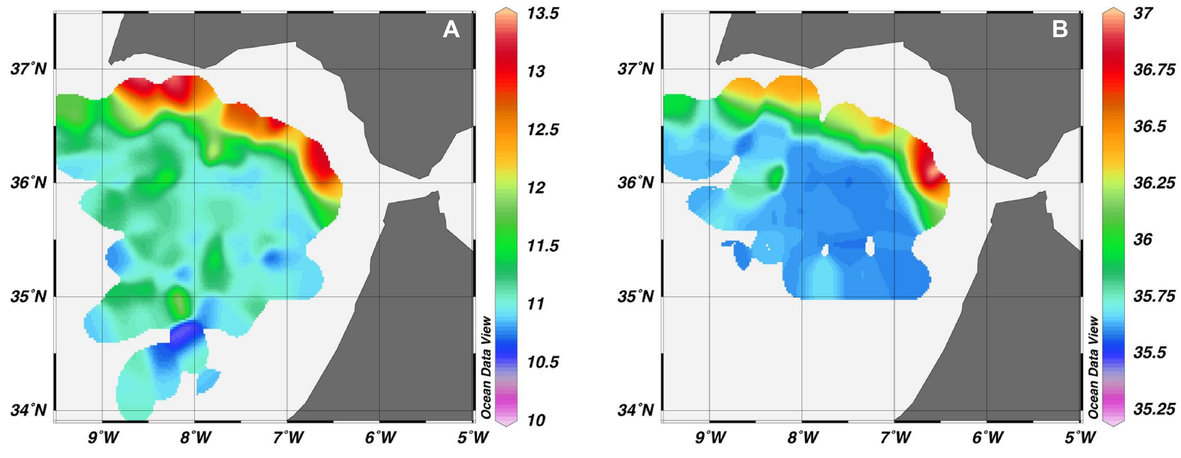

Figure 2: thermo-haline signature of the MOW in the Gulf of Cadiz.

Presently, the MOW is characterized by a mean temperature of 13°C (*figure 2A*), a salinity of 36.5 ‰ (*figure 2B*), and a oxygenation of 4 ‰ (Madelain, 1970; Ambar and Howe, 1979a and b).

The MOW speed is up to 3 m/s^{-1} just out of the Strait of Gibraltar; this velocity decreases downstream from the Strait and reaches a few cm/s^{-1} seaward of the Cape St-Vincent. This gradient of velocities generates a particule sorting: coarse sediments (gravel and sand) in the most proximal parts of Gibraltar, and fine material (silt and clay) more distally.

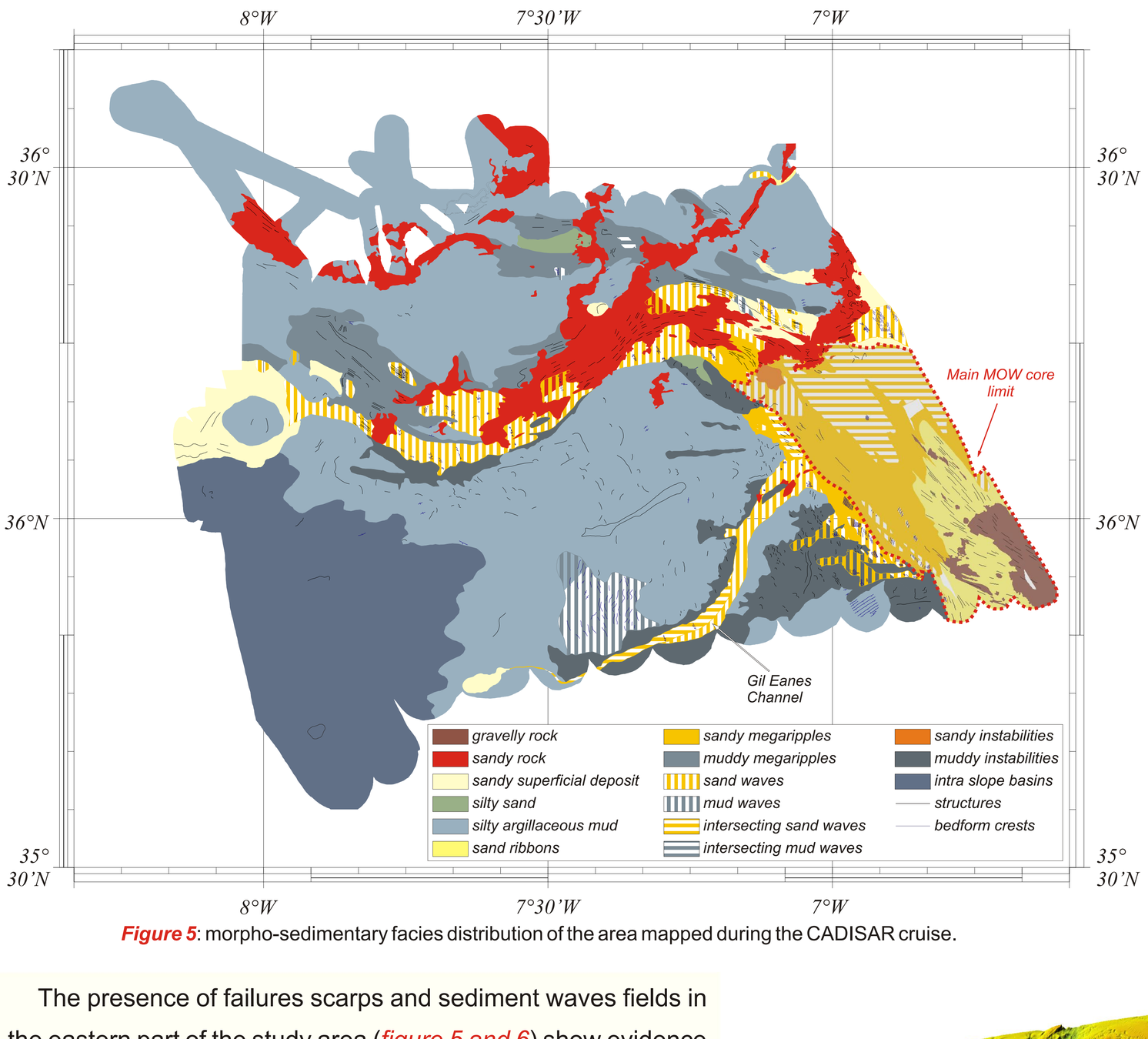

Figure 5: morpho-sedimentary facies distribution of the area mapped during the CADISAR cruise.

New high-resolution bathymetry and imagery data were collected during the CADISAR cruise (August 2001) using a multibeam echosounder EM300 and the SAR, a towed multisensor geophysical tool.

Recognition and interpretation of the morpho-sedimentary facies (e.g. *figure 3 and 4*) allowed to establish a map of the morpho-sedimentary facies distribution in the study area (*figure 5*). This map shows a logical repartition of the surface sediment. This organization allows to highlight erosion areas (abrasive action of the MOW) and deposit areas (lower flow velocities).

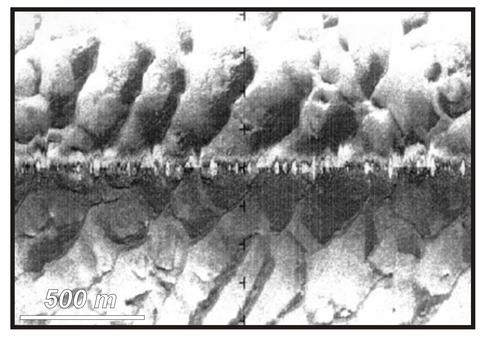

Figure 3: SAR imagery detail of the sand waves.

Figure 4: EM300 imagery detail of the muddy instabilities.

The presence of failures scarps and sediment waves fields in the eastern part of the study area (*figure 5 and 6*) show evidence of the spilling of the MOW.

The crest orientation of the sediment waves in the the eastern part of the study area suggests a westward direction of the MOW at these location (*figure 5*).

Erosive structures and coarse sediments covering the channel floor of the main MOW core (*figure 5*) indicate high MOW velocities. Conversely, sediment waves covering the topographic high bordering the western part of the main MOW core (*figure 5*) show deposition and a westward decrease of the MOW velocity.

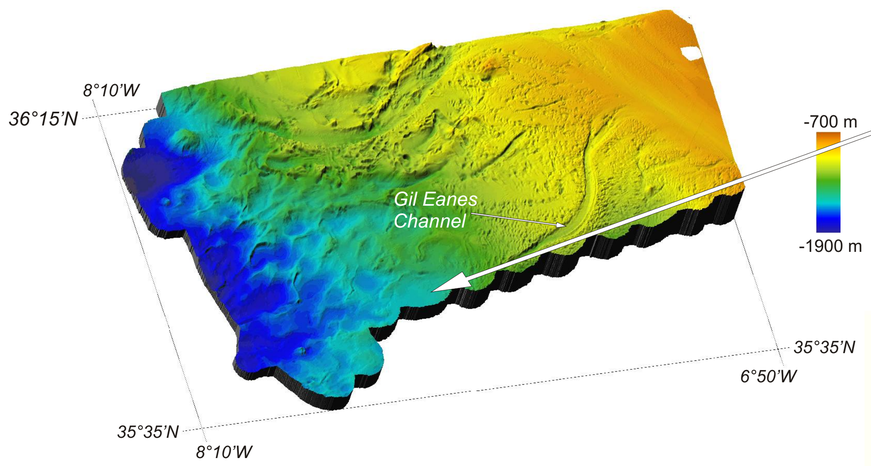

Figure 6: 3D bathymetry detail of the eastern part of the study area.

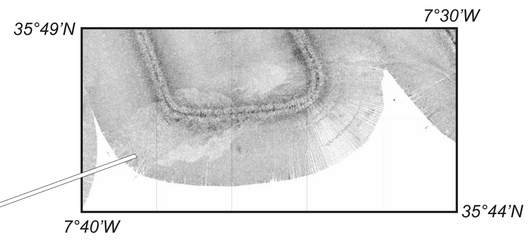

Figure 7: EM300 imagery detail of the terminal lobes of the Gil Eanes channel.

These observations suggest that the eastern part of the study area acts as a giant sedimentary levee built by stacked contourites deposited by loss of competency of the part of the MOW that flows over a sedimentary levee.

The part of the main core that does not spill over this giant contouritic levee is drained by the Gil Eanes Channel (*figure 5 and 6*). The topographic high and the intense deformation that appears on the north channel side could be explained by the spilling of the channeled flow.

The existence of overspread instabilities on the north side of the Gil Eanes channel, sediment waves along its floor and of small sandy lobes at its mouth (figure 7) are morphologic convergences with channel-levee complexes formed by turbidity current activity. However, the major difference is that here, the main process for particle transport is an energetic contour current.