

## Aplicacions del CPTU en Geociències Marines: estudi de casos de la Mediterrània

Sara Lafuerza Colas

**ADVERTIMENT.** La consulta d'aquesta tesi queda condicionada a l'acceptació de les següents condicions d'ús: La difusió d'aquesta tesi per mitjà del servei TDX ([www.tesisenxarxa.net](http://www.tesisenxarxa.net)) ha estat autoritzada pels titulars dels drets de propietat intel·lectual únicament per a usos privats emmarcats en activitats d'investigació i docència. No s'autoritza la seva reproducció amb finalitats de lucre ni la seva difusió i posada a disposició des d'un lloc aliè al servei TDX. No s'autoritza la presentació del seu contingut en una finestra o marc aliè a TDX (framing). Aquesta reserva de drets afecta tant al resum de presentació de la tesi com als seus continguts. En la utilització o cita de parts de la tesi és obligat indicar el nom de la persona autora.

**ADVERTENCIA.** La consulta de esta tesis queda condicionada a la aceptación de las siguientes condiciones de uso: La difusión de esta tesis por medio del servicio TDR ([www.tesisenred.net](http://www.tesisenred.net)) ha sido autorizada por los titulares de los derechos de propiedad intelectual únicamente para usos privados enmarcados en actividades de investigación y docencia. No se autoriza su reproducción con finalidades de lucro ni su difusión y puesta a disposición desde un sitio ajeno al servicio TDR. No se autoriza la presentación de su contenido en una ventana o marco ajeno a TDR (framing). Esta reserva de derechos afecta tanto al resumen de presentación de la tesis como a sus contenidos. En la utilización o cita de partes de la tesis es obligado indicar el nombre de la persona autora.

**WARNING.** On having consulted this thesis you're accepting the following use conditions: Spreading this thesis by the TDX ([www.tesisenxarxa.net](http://www.tesisenxarxa.net)) service has been authorized by the titular of the intellectual property rights only for private uses placed in investigation and teaching activities. Reproduction with lucrative aims is not authorized neither its spreading and availability from a site foreign to the TDX service. Introducing its content in a window or frame foreign to the TDX service is not authorized (framing). This rights affect to the presentation summary of the thesis as well as to its contents. In the using or citation of parts of the thesis it's obliged to indicate the name of the author.



Universitat de Barcelona  
Departament d'Estratigrafia, Paleontologia i Geociències Marines

## **Aplicacions del CPTU en Geociències Marines: estudi de casos de la Mediterrània**

Memòria de Tesi Doctoral realitzada per  
**Sara Lafuerza**

Sota la direcció del  
**Dr. Miquel Canals i Artigas**

Barcelona, Novembre del 2009

La doctoranda,

El director,

Sara Lafuerza

Miquel Canals

## **CAPÍTOL 8**

REFERÈNCIES

- Abdel Aal, A., El Barkooky, A., Gerrits, M., Meyer, H., Schwander, M., Zaki, H., 2001. Tectonic evolution of the Eastern Mediterranean Basin and its significance for hydrocarbon prospectivity in the ultradeepwater of the Nile Delta. *The Leading Edge*, 1086-1102.
- Acosta, J., 2005. El Promontorio Balear: morfología submarina y recubrimiento sedimentario. Tesis Doctoral. Universitat de Barcelona, Barcelona. Pp. 150.
- Acosta, J., Canals, M., López-Martínez, J., Muñoz, A., Herranz, P., Urgeles, R., Palomo, C., Casamor, J.L., 2002. The Balearic Promontory geomorphology (western Mediterranean): morphostructure and active processes. *Geomorphology*, 49: 177-204.
- Acosta, J., Ancochea, E., Canals, M., Huertas, M.J. i Uchupi, E., 2004. Early Pleistocene volcanism in the Emile Baudot Seamount, Balearic Promontory (Western Mediterranean Sea). *Marine Geology*, 207 (1-4): 247-257.
- Ahmadi, M.M., Robertson, P.K., 2005. Thin-layer effects on the CPT  $q_c$  measurements. *Canadian Geotechnical Journal*, 42: 1302-1317.
- Aloïsi, J-C., 1978. The Holocene transgression in the golfe du Lion, southwestern France: paleogeographic and paleobotanical evolution. *Géographie Physique et Quaternaire*, 32 (2): 145-182.
- Aloïsi, J-C., 1986. Sur un modèle de sédimentation deltaïque: contribution à la connaissance des marges passives. Tesi Doctoral, Universitat de Perpignan. Pp. 162.
- Alonso, B., Canals, M., Got, H., Maldonado, A., 1991. Seavalleys and related depositional systems in the Catalan Sea (northwestern Mediterranean Sea). *American Association of Petroleum Geologists Bulletin*, 75: 1195-1214.
- Amorosi, A., Marchi, N., 1999. High-resolution sequence stratigraphy from piezocone tests: an example from the late Quaternary deposits of the south-eastern Po plain. *Sedimentary Geology*, 128: 67-81.
- Amorosi, A., Milli, S., 2001. Late Quaternary depositional architecture of Po and Tevere river deltas (Italy) and worldwide comparison with coeval deltaic successions. *Sedimentary Geology*, 144: 357-375.
- ASTM, 1993. Standard Test Method for One-Dimensional Consolidation Properties of Soils. Annual Book of ASTM Standards, D2435-90, Vol. 04-08: 313-323.
- ASTMD5778-95, 2000. Standard test method for performing electronic friction cone and piezocone penetration testing of soils. American Society for Testing and Materials, west Conshohocken, PA, USA.
- Bache, F., Oliviet, J-L., Gorini, C., Rabineau, M., Baztan, J., Aslanian, D., Suc, J-P., 2009. Messinian erosional and salinity crises: view from the Provence Basin (Gulf of Lions, Western Mediterranean). *Earth and Planetary Sciences*, 286: 139-157.
- Badri, M. A., Sayers, C.M., Awad, R., Graziano, A., 2000. A feasibility study for pore-pressure prediction using seismic velocities in the offshore Nile Delta, Egypt. *The leading edge*, October: 1103-1108.
- Baraza, J., Lee, H., Kayen, R.E., Hampton, M.A., 1990. Geotechnical characteristics and slope stability on the Ebro margin, western Mediterranean. *Marine Geology*, 95: 379-393.
- Bassetti, M.A., Jouet, G., Dufois, F., Berné, S., Rabineau, M., Taviani, M., 2006. Sand bodies at the shelf edge in the Gulf of Lions (Western Mediterranean): Deglacial history and modern processes. *Marine Geology*, 234: 93-109.
- Bassetti, M.A., Berné, S., Jouet, G., Taviani, M., Dennielou, B., Flores, J-A., Gaillot, A., Gelfort, R., Lafuerza, S., Sultan, N., 2008. The 100-ka and rapid sea level

- changes recorded by prograding shelf sand bodies in the Gulf of Lions (western Mediterranean Sea), *Geochemistry Geophysics and Geosystems*, 9: Q11R05. Doi:10.1029/2007GC001854.
- Bayó, A., 1985. Les aigües. A "Història Natural dels Països Catalans", Vol. 3. Enciclopèdia Catalana, Barcelona. Pp 21-41.
- Bayon, G., Loncke, L., Dupré, S., Caprais, J-C., Ducassou, E., Duperron, S., Etoubleau, J., Foucher, J-P., Fouquet, Y., Gontharet, S., Henderson, G-M., Huguen, C., Klauke, I., Mascle, J., Migeon, S., Olu-Le Roy, K., Ondréas, H., Pierre, C., Sibuet, M., Stadnitskaia, A., Woodside, J., 2009. Multi-disciplinary investigation of fluid seepage on an unstable margin: The case of the Central Nile deep sea fan. *Marine Geology*, 261: 92-104.
- Baztán, J., Berné, S., Olivet, J-L., Rabineau, M., Aslanian, D., Gaudin, M., Réhault, J-P., Canals, M., 2005. Axial incision: the key to understand submarine canyon evolution (in the western Gulf of Lion). *Marine and Petroleum Geology*, 22: 805-826.
- Berger, A., Loutre, M.F., 1992. Astronomical solutions for the paleoclimate studies over the last 3 million years. *Earth and Planetary Science Letters*, 111 (2-4): 369-382.
- Berné, S., Loubrieu, B., Calmar Shipboard party, 1999. Canyons and recent sedimentary processes on the western Gulf of Lions margin. First results of the Calmar cruise. *Comptes Rendus de l'Académie des sciences Paris*, 328: 471-477.
- Berné, S., Carré, D., Loubrieu, B., Mazé, J-P., Normand, A., 2001. Carte morphobatimétrique du Golfe du Lion à l'échelle 1/100000ème. IFREMER et Région Languedoc Roussillon Brest.
- Berné, S., Carré, D., Loubrieu, B., Mazé, J-P., Morvan, L., Normand, A., 2004a. Le Golfe du Lion, Carte Morpho-Bathymétrique, scale 1:250,000. Edition Ifremer. ISBN 2-84433-140-8.
- Berné, S., Rabineau, M., Flores, J.A., Sierro, F.J., 2004b. The Impact of Quaternary global changes on strata formation, exploration of the shelf edge in the northwest Mediterranean Sea, *Oceanography*, 17 (4): 92-117.
- Berné, S., Gorini, C., 2005. The Gulf of Lions: An overview of recent studies within the 'French Margins' programme. *Marine Petroleum Geology*, 22 (6-7): 691-693.
- Berné, S., Jouët, G., Alix, A-S., Bassetti, M.A., Canals, M., Cattaneo, A., Colmenero, H., Dennielou, B., Floch, G., Frigola, J., Frumoltz, N., Flores, J.A., Gelfort, R., Gravalosa, J., Rabineau, M., Ridente, D., Schneider, R., Schoolmester, T., Sierro, F.J., Sultan, N., Taviani, M., Thereau, E.T., Tulloch, G., Thouveny, N., Wallrabe-Adams, HJ., 2006. Integrating seismic and core data at PRGL1 and PRGL2 Promess drillsites, a first attempt. *Geophysical Research Abstracts*, EGU06-A-02282.
- Bolle, M.P., Adatte, T., 2001. Palaeocene-early Eocene climatic evolution in the Tethyan realm: clay mineral evidence. *Clay Minerals*, 36: 249-261.
- Bolton, A.J., Maltman, A.J., Clenell, M.B., 1998. The importance of overpressure timing and permeability evolution in fine-grained sediments undergoing shear. *Journal of Structural Geology*, 20 (8): 1013-1022.
- Bryant, W.R., Jia Yuh Liu, D.B., Dunlap, W., 2000. Geotechnical Stratigraphy of Sediments of the Northwest Gulf of Mexico Continental Slope. Offshore Technology Conference, Houston, Texas. Doi: 10.4043/12104-MS.
- BS5930, B.S., 1999. Code of practice for site investigations: London, British Standards Institution.
- Burnett, W.C., Aggarwal, P.K., Aureli, A., Bokuniewicz, H., Canle, J.E., Charette, M.A., Kontar, E., Krupa, S., Kulkarni, K.M., Loveless, A., Moore, W.S., Oberdorfer, J.A., Oliveira, J., Ozyurt, N., Povinec, P., Privitera, A.M.G., Rajar, R.,

- Ramessur, R.T., Scholten, J., Stieglitz, T., Taniguchi, M., Turner, J.V., 2006. Quantifying submarine groundwater discharge in the coastal zone via multiple methods. *Science of Total Environment*, 367: 498-543.
- Camerlenghi, A., Urgeles, R., Fantoni, L., 2009. A database on submarine landslides of the Mediterranean Sea. *Advances in Natural and Technological Hazards Research. Submarine Mass Movements and Their Consequences IV, The fourth international symposium on submarine mass movements and their consequences*, November 8-11, Austin, Texas.
- Campanella, R.G., Robertson, P.K., Gillespie, D., 1983. Cone penetration testing in deltaic soils. *Canadian Geotechnical Journal*, 20: 23-35.
- Canals, M., 1985. Estructura sedimentaria y evolución morfológica del talud y el glacis continentals del Golfo de León: Fenómenos de desestabilización de la cobertura plio-cuaternaria. Tesis Doctoral. Universitat de Barcelona, Barcelona. Pp. 618.
- Canals, M., 2009. Deslizamientos submarinos y sus consecuencias. A: VII Simposio Nacional sobre Taludes y Laderas Inestables, Barcelona, 27-30 d'Octubre de 2009, Proceedings (en premsa).
- Canals, M., Ballesteros, E., 1996. Production of carbonate particles by phytobenthic communities on the Mallorca-Menorca shelf, Northwestern Mediterranean Sea. *Deep Sea Research*, 44: 611-629.
- Canals, M., Lastras, G., Urgeles, R., Casamor, J.L., Mienert, J., Cattaneo, A., De Batist, M., Hafliðason, H., Imbo, Y., Laberg, J.S., Locat, J., Long, D., Longva, O., Masson, D.G., Sultan, N., Trincardi, F., Bryn, P., 2004a. Slope failure dynamics and impacts from seafloor and shallow sub-seafloor geophysical data: case studies from the COSTA Project. *Marine Geology*, 213: 9-72. ISSN 0025-3227. Doi: 10.1016/j.margeo.2004.10.001.
- Canals, M., Casamor, J.L., Lastras, G., Monaco, A., Acosta, J., Berné, S., Loubrieu, S., Weaver, P.P.E., Grehan, A., Dennielou, B., 2004b. The role of canyons on strata formation. *Oceanography*, 17 (4): 80-91.
- Canals, M., Puig, P., Durrieu de Madron, X., Heussner, S., Palanques, A., Fabres, J., 2006. Flushing submarine canyons. *Nature*, 444. Doi: 10.1038/nature05271.
- Canals, M., Danovaro, R., Heussner, S., Lykousis, V., Puig, P., Trincardi, F., Calafat, A.M., Durrieu de Madron, X., Palanques, A., Sánchez-Vidal, A., 2009. Cascades in Mediterranean Submarine Grand Canyons. *Oceanography*, 22 (1): 26-43.
- Casagrande, A., 1936. The determination of the pre-consolidation load and its practical significance. In *Proceedings of the 1st International Soil Mechanics and Foundation Engineering Conference*, Cambridge, Mass., 22-26 June 1936. Edited by A. Casagrande. Graduate School of Engineering, Harvard University, Cambridge, Vol. 3: 60-64.
- Cattaneo, A., Asioli, A., Minisini, D., Remia, A., Taviani, M., Canals, M., De Mol, B., Lafuerza, S., Lastras, G. Age and stratigraphic constraints on the emplacements of Ana Slide (Ibiza Channel, Western Mediterranean). *Sotmès a publicació a International Journal of Earth Sciences*.
- Checa, A., Díaz, J.I., Farran, M., Maldonado, A., 1988. Sistemas deltaicos holocenos de los ríos Llobregat, Besós y Foix: modelos evolutivos transgresivos. *Acta Geológica Hispánica*, 23: 241-225.
- Cita, M.B., 2006. The Messinian Salinity Crisis revisited. *Sedimentary Geology*, 188-189: 1-8.
- Cita, M.B., Vergnaud-Grazzini, C., Robert, C., Chamley, H., Ciaranfi, N., D'Onofrio, S., 1977. Paleoclimatic record of a long deep sea core from the eastern Mediterranean. *Quaternary Research*, 8: 205-235.
- Cochonat, P., Bourillet, J.F., Savoye, B. i Dodd, L., 1993. Geotechnical characteristics

- and instability of submarine slope sediments, the Nice slope (N–W Mediterranean Sea). *Marine Georesources and Geotechnology*, 11: 131–151.
- Costa, S., Berndt, C., Canals, M., Camerlenghi, A., De Mol, B., Urgeles, R., Saunders, M.R., 2009. Sediment instability and fluid flow in the Eivissa Channel, Western Mediterranean Sea. 27<sup>th</sup> IAS Meeting, Alghero.
- Craig, R. F., 2005. *Craig's soil mechanics*. 7<sup>th</sup> Edition, Spon Press Cornwall. Pp. 447.
- Dalla, S., Harby, H., and Serazzi, M., 1997. Hydrocarbon exploration in a complex incised valley fill: An example from the late Messinian Abu Madi Formation (Nile Delta Basin, Egypt): The Leading Edge, 1819-1824.
- Dan, G., Sultan, N., Savoye, B., 2007. The 1979 Nice harbour catastrophe revisited: Trigger mechanism inferred from geotechnical measurements and numerical modeling. *Marine Geology*, 245 (1-4): 40-64. ISSN 0025-3227. Doi: 10.1016/j.margeo.2007.06.011.
- Dando, P.R., Stüben, D., Varnavas, S.P., 1999. Hydrothermalism in the Mediterranean Sea. *Progress in Oceanography*, 44: 333-367.
- Davis, E.E., Horel, G.C., MacDonals, R.D., 1990. Pore pressure and permeabilities measured in marine sediments with a tethered probe. *Journal of Geophysical Research*, 96 (B4): 5975-5984.
- deMenocal, P., 2004. African climate change and faunal evolution during the Pliocene-Pleistocene. *Earth and Planetary Science Letters*, 220: 3-24.
- Demers, D., Leroueil, S., 2002. Evaluation of preconsolidation pressure and the overconsolidation ratio from piezocone tests of clay deposits in Quebec. *Canadian Geotechnical Journal*, 39: 174-192.
- Dennielou, B., Sultan, N., Sierro, F., Gelfort, R., Berné, S., Promess1 shipboard party, 2006. The impact of sediment compaction on the calculation of the sedimentation rates and sedimentary fluxes based on physical and geotechnical properties from Promess1 borehole PRGL1 (Gulf of Lions, Western Mediterranean). *Geophysical Research Abstracts*, EGU06-A-07986.
- Devincenzi, M.J., Colas, S., Casamor, J.L., Canals, M., Falivene, O. and Busquets, P., 2003. Aplicación del piezocono para el estudio sedimentológico de detalle de los sedimentos cuaternarios del delta del Llobregat, Barcelona. III Congreso andaluz de carreteras, Sevilla. October 2003. Pp 937-954.
- Diaz, J., Weimer, P., Dorn, G., 2006. 3-D stratigraphic interpretation of Quaternary Mass-Transport Deposits in the Mensa and Thunder Horse Intraslope Basins, Mississippi Canyon, Northern Deep Gulf of Mexico. American Association of Petroleum Geologists, Annual meeting, Houston. Ref. 90052.
- Domínguez, O., 2002. Estudi sedimentològic aplicat al delta del riu Llobregat. Treball de Fí de Carrera. Universitat de Barcelona, Barcelona. Pp. 254.
- dos Reis, T., Gorini, C., Mauffret, A., 2005. Implications of salt-sediment interactions on the architecture of the Gulf of Lions deep-water sedimentary systems-western Mediterranean Sea. *Marine Petroleum Geology*, 22: 713-746.
- Doveton, J.H., 1995. Geologic log analysis using computer methods, American Association of Petroleum Geologists computer applications in Geology 2. Pp. 195.
- Droz, L. 1983. L'éventail sous-marin profond du Rhône (Golfe du Lion): grands traits morphologiques et structure semi-profonde. Tesi Doctoral, Universitat de Paris VI, Paris. Pp. 195.
- Droz, L., Bellaiche, G., 1985. Rhône deep-sea fan: morphostructure and growth pattern. *American Association of Petroleum Geologists bulletin*, 69: 460-479.
- Droz, L., dos Reis, A.T., Rabineau, M., Berné, S. i Bellaiche, G., 2006. Quaternary

- turbidite systems on the northern margins of the Balearic Basin (Western Mediterranean): a synthesis. *Geo-Marine Letters*, 26 (6): 347-359.
- Ducassou, E., Capotondi, L., Murat, A., Bernasconi, S.M., Mulder, T., Gonthier, E., Migeon, S., Duprat, J., Giraudeau, J., Mascle, J., 2007. Multiproxy Late Quaternary stratigraphy of the Nile seep-sea turbidite system-Towards a chronology of deep-sea terrigenous systems. *Sedimentary Geology*, 200: 1-13.
- Dugan, B., Flemings, P., Olgaard, D.L., Gooch, M.J., 2003. Consolidation, effective stress, and fluid pressure of sediments from ODP Site 1073, US mid-Atlantic continental slope. *Earth Planetary Science Letters*, 215: 13-26.
- Duggen, S., Hoernle, K., van den Bogaard, P., Harris, C., 2004. Magmatic evolution of the Alboran region: the role of subducting in forming the western Mediterranean and causing the Messinian Salinity Crisis. *Earth and Planetary Science Letters*, 218: 91-108.
- Dupré, S., Woodside, J., Foucher, J-P., de Lange, G., Mascle, J., Boetius, A., Mastalerz, V., Stadnitskaia, A., Ondréas, H., Huuen, C., Harmégnies, F., Gontharet, S., Loncle, L., Deville, E., Niemann, H., Omoregie, E., Olu-Le Roy, K., Fiala-Mdioni, A., Dahlmann, A., Caprais, J-C., Prinzhofner, A., sibuet, M., Pierre, C., Damsté, J-S., NAUTINIL scientific party, 2007. Seafloor geological studies above active gas chimneys off Egypt (Central Nile Deep Sea Fan). *Deep-Sea Research, Part I, Oceanographic Research papers*, 54 (7): 1146-1172.
- Eddy, C.A., Looney, B.B., 1993. Three-dimensional digital imaging of environmental data: selection of gridding parameters. *International Journal Geographical Information Systems*, 7 (2): 165-172.
- Ellis, S., Pecher, I., Kukowski, N., Xu, W., Henrys, S., Greinert, J., 2009. Testing probe mechanisms for seafloor weakening at the top of gas hydrate stability on an uplifted submarine ridge (Rock Garden), New Zealand. *Marine Geology*. Doi: 10.1016/j.margeo.2009.10.008.
- Emelianoiv, M., Font, J., Turiel, A., Solé, J., Poulain, P., Julià, A., Vitrià, M.R., 2006. Transformation of levantine Intermediate Water tracked by MedArgo floats in Western Mediterranean. *Ocean Science Discussions*, 3: 569-584.
- Evans, T., Usher, N. and Moore, R., 2007. Management of geotechnical and geohazard risks in the west Nile Delta. *Proceedings of the 6<sup>th</sup> International offshore site investigation and geotechnics conference: confronting new challenges and sharing knowledge*, London. Pp. 263-270.
- Expedition 308 Scientists, 2005. Overpressure and fluid flow processes in the deep water Gulf of Mexico: slope stability, seeps and shallow-water flow. *IODP Preliminar Report 308*. Doi: 10:2204/iodp.
- Feng, T.W., 2001. A linear log d-log w model for the determination of consistency limits of soils. *Canadian Geotechnical Journal*, 38: 1335-1342.
- Fernández -Salas, L.M., Lobo, F.J., Hernández.Molina, F.J., Somoza, L., Rodero, J., Díaz del Río, V. and Maldonado, A., 2003. High-resolution architecture of Late Holocene highstand prodeltaic deposits from southern Spain: the imprint of high-frequency climatic and relative sea level changes. *Continental Shelf Research*, 23: 1037-1054.
- Fine, I.V., Rabinovich, A.B., Bornhold, B.D., Thomson, R.E., Kulikov, E.A., 2005. The Grand Banks landslide-generated tsunami of November 18, 1929: preliminary analysis and numerical modeling. *Marine Geology*, 215: 45-57.
- Flach, P.G. Ham, L.L, Harris, M.K., Thayer, P.A., Haselow, J.S., Smits, A.D., 2003. A method for characterizing hydrogeologic heterogeneity using



- lithologic data. A G. Fraser, J.M. Davis (Eds.), *SEPM Concepts in Hydrogeology and Environmental Geology 1*. Pp 119-137.
- Flemings, P., Lupa, J.A., 2004. Pressure prediction in the Bullwinkle Basin through petrophysics and flow modeling (Green Canyon 65, Gulf of Mexico). *Marine and Petroleum Geology*, 21: 1311-1322.
- Flemings, P.B., Long, H., Dugan, B., Germaine, J., John, C.M., Behrmann, J.H., Sawyer, D., IODP Expedition 308 Scientists, 2008. Pore pressure penetrometers document high overpressure near the seafloor where multiple submarine landslides have occurred on the continental slope, offshore Louisiana, Gulf of Mexico. *Earth and Planetary Science Letters*, 269: 309-325.
- Foucault, A., Mélières, F., 2000. Paleoclimatic cyclicity in central Mediterranean pliocene sediments: the mineralogical signal. *Paleogeography, Paleoclimatology and Paleoecology*, 158: 311-323.
- Fredlund, D.G., Rajardjo, H., 1993. *Soil Mechanics for Unsaturated Soils*. John Wiley & Sons, New York. Pp. 510.
- Frigola, J., Canals, M., Berné, S., Cacho, I., Herrera, G., Dennielou, B., Gelfort, R., Alix, A-S., Bassetti, M.A., Scientific Party, 2005. Preliminary sedimentological and geochemical results from borehole GL1-4 in the North Western Mediterranean Sea, project PROMESS 1. *Geophysical Research Abstracts*, EGU05-A-08590.
- Fugro Limited, 2004. Geotechnical report soil parameters, Reconnaissance investigation Raven field, west Nile Delta, offshore Egypt. Pp. 812. No publicat.
- Gàmez, D., Simó, J.A., Vázquez-Suñé, E., Salvany, J.M., Carrera, J., 2005. Variación de las tasas de sedimentación en el Complejo Detrítico Superior del Delta del Llobregat (Barcelona): su relación con causas eustáticas, climáticas y antrópicas. *Geogaceta*, 38: 175-178.
- García-García, A., Orange, D.L., Lorenson, T., Radakovitch, O., Tesi, T., Miserocchi, S., Berné, S., Friend, P.L., Nittrouer, C., Normand, A., 2006. Shallow gas off the Rhône prodelta, Gulf of Lions. *Marine Geology*, 234: 215-231.
- García-García, A., Orange, D.L., Miserocchi, S., Correggiari, A., Langone, L., Lorenson, T.D., Trincardi, F., Nittrouer, C.A., 2007. What controls the distribution of shallow gas in the Western Adriatic Sea? *Continental Shelf Research*, 27: 359-374.
- Garfunkel, Z., Almagor, G., 1985. Geology and structure of the continental margin off northern Israel and the adjacent part of the Levantine Basin. *Marine Geology*, 62: 105-131.
- Garrison, L.E., 1977. The SEASWAB experiment, Marine slope stability, Editor A.F. Richards, *Marine Geotechnology*, 2: 117-122.
- Garziglia, S., Ioulalen, M., Migeon, S., Ducassou, E., Mascle, J., Sardou, O., Brosolo, L., 2007. Triggering factors and tsunamigenic potential of a large submarine mass failure on the western Nile Margin (Rosetta area, Egypt). In V. Lykousis, D. Sakellariou and J. Locat (eds.), *3rd Submarine Mass Movement And Their Consequences Conference*. Pp. 9.
- Garziglia, S., Migeon, S., Ducassou, E., Loncke, L., Mascle, J., 2008. Mass-transport deposits on the Rosetta province (NW Nile deep-sea turbidite system, Egyptian margin): Characteristics, distribution, and potential causal processes. *Marine Geology*, 250: 180-198.
- Geist, E.L., 2000. Origin of the 17 July 1998 Papua New Guinea tsunami: Earthquake or landslide?. *Seismological Research Letters*, 71 (3): 344-351.
- Gensous, B., Tesson, M., 1996. Sequence stratigraphy, seismic profiles, and cores of Pleistocene deposits on the Rhône continental shelf. *Sedimentary Geology*, 105: 183-190.

- Gordon, D.S., Flemings, P.B., 1998. Generation of overpressure and compaction-driven fluid flow in Plio-Pleistocene growth-faulted basin, Eugene Island 330, offshore Louisiana. *Basin Research*, 10: 177-196.
- Gracia, E., Dañobeitia, J.J., PARSIFALTeam, 2003. Mapping active faults offshore Portugal (368N–388N): implications for seismic hazard assessment along the southwest Iberian margin. *Geology*, 31 (1): 83-86.
- Grozić, J.L.H., Lunne, T., Pande, S., 2003. An oedometer test study on the preconsolidation stress of glaciomarine clays. *Canadian Geotechnical Journal*, 40: 857-872.
- Hansbo, S., 1957. A new approach to the determination of the shear strength of clay by the fall-cone test. *Royal Swedish Geotechnical Institute Proceedings*, 14, Stockholm.
- Haq, B.U., Hardenbol, J., Vail, P., 1987. Chronology of fluctuating sea level since the Triassic (250 million years ago to present). *Science*, 235: 1156-1166.
- Hassold, N., Rea, D.K., Meyers, P.A., 2003. Grain size evidence for variations in delivery of terrigenous sediments to a middle Pleistocene interrupted sapropel from ODP site 969, Mediterranean Ridge. *Paleogeography, Paleoclimatology, Paleoecology*, 190: 211-219.
- Hayward, B.W., Sabaa, A., Kawagata, S., Grenfell, H.R., 2009. The early Pliocene re-colonisation of the deep Mediterranean Sea by benthic foraminifera and their pulsed Late Pliocene-Middle Pleistocene decline. *Marine Micropaleontology*, 71 (3-4): 97-112.
- Heezen, B.C., Ewing, M., 1952. Turbidity currents and submarine slumps, and the 1929 Grand banks earthquake. *American Journal of science*, 250 (12): 849-873. ISSN: 0002-9599
- Hegazy, Y.A., Mayne, P., 2002. Objective site characterization using clustering of piezocone data. *Journal of Geotechnical and Geoenvironmental Engineering*, 128 (12): 986-996.
- Hernández-Molina, F.J., Somoza, L., Pomar, L., 1994. Late Pleistocene sediments on the Spanish continental shelves: model for very high resolution sequence stratigraphy. *Marine Geology*, 120: 129-174.
- Hernández-Molina, F.J., Somoza, L., Vázquez, J.T., Lobo, F., Fernández-Puga, M.C., Llave, E., Díaz-del Río, V., 2002. Quaternary stratigraphic stacking patterns on the continental shelves of the southern Iberian Peninsula: their relationship with global climate and paleoceanographic changes. *Quaternary International*, 92: 5-23.
- Hill, P.R., 2003. Multibeam mapping of active slope instability features: examples from the Fraser River and Squamish river deltas, British Columbia, Canada. *American Geophysical Union, Fall Meeting*. #OS23B-1314.
- Hirsch, F., Flexer, A., Rosenfeld, A., Yellin, D.A., 1995. Palimpsestic and crystal setting of the Eastern Mediterranean. *Journal of Petroleum Geology*, 18 (2): 149-170.
- Hori, K., Tanabe, S., Saito, Y., Haruyama, Sh., Nguyen, V. and Kitamura, A., 2004. Delta initiation and Holocene sea level change: example from the Song Hong (Red River) delta, Vietnam. *Sedimentary Geology*, 164: 237-249.
- Hsu, K.J., 1972. When the Mediterranean dried up. *Scientific American*, 227: 27-36.
- Huang, A.B., Mayne, P.W., 2008. Geotechnical and geophysical site characterization. *Proceedings of the Third International Conference On Site Characterization*. Taylor & Francis, London. Pp. 249. ISBN 978-0-415-46936-4.
- Hühnerbach, V., Masson, D., COSTA project partners, 2004. Landslides in the North Atlantic and its adjacent seas: an analysis of their morphology, setting and behaviour. *Marine Geology*, 213: 343–362.
- Hutchinson, M.F., Gessler, P.E., 1994. Splines-

- more than just a smooth interpolator. *Geoderma*, 62: 45-67.
- ISSMGE, 1999. International reference test procedure for the Cone Penetration Test (CPT) and the Cone Penetration Test with Pore Pressure (CPTU), report of the ISSMGE Technical Committee 16 on Ground Property Characterization from in-situ testings, Proceedings of the Twelfth European conference on Soil mechanics and geotechnical Engineering, Amsterdam, 3, 2195-2222.
- Jansen, E., Befring, S., Bugge, T., Holtedahl, H., Sejrup, H.P., 1987. Large submarine slides on the Norwegian continental margin: sediments, transport and timing. *Marine Geology*, 78: 77-107.
- Jouet, G., Berné, S., Rabineau, M., Bassetti, M.A., Bernier, P., Dennielou, B., Flores, J.A., Sierro, F.J., Taviani, M., 2006. Shoreface migrations at the shelf edge and sea-level changes around the last glacial maximum (Gulf of Lions, NW Mediterranean). *Marine Geology*, 234: 21-42.
- Jouet, G., 2007. Enregistrements stratigraphiques des cycles climatiques et eustatiques du Quaternaire terminal - Modélisations de la marge continentale du Golfe du Lion. Tesi Doctoral, Université de Bretagne Occidentale, Brest. Pp. 463.
- Judd, A., Hovland, M., 2007. Seabed Fluid Flow, The Impact on Geology, Biology, and the Marine Environment. Cambridge University Press, New York, Pp. 475. ISBN-13 978-0-521-81950-3.
- Klaucke, I., Cochonat, P., 1999. Analysis of past seafloor failures on the continental slope off Nice (SE France). *Geo-Marine Letters*, 19: 245– 253.
- Konert, M., Vandenberghe, J., 1997. Comparison of laser grain size analysis with pipette and sieve analysis: a solution for the underestimation of the clay fraction. *Sedimentology*, 44: 523-535.
- Kopf, A., Clennell, M.B. and Flecker, R., 1998. Relationship between the variation of undrained shear strength, organic carbon content, and the origin and frequency of enigmatic normal faults in fine-grained sediments from advanced piston cores from the eastern Mediterranean, Proceedings of the Ocean Drilling Program, Scientific Results, 160. Pp. 645-661.
- Krijgsman, W., Blanc-Valleron, M.M., Flecker, R., Hilgen, F.J., Kouwenhoven, T.J., Merle, D., Orszag-Sperber, F., Rouchy, J.M., 2002. The onset of the Messinian salinity crisis in the Eastern Mediterranean (Pissouri Basin, Cyprus). *Earth and Planetary Science Letters*, 194: 299-310.
- Kvalstad, T.J., Andresen, L., Forsberg, C.F., Berg, K., Bryn, P., Wangen, M., 2005. The Storegga slide: Evaluation of triggering sources and slide mechanics. *Marine and Petroleum Geology*, 22 (1-2): 245-256.
- Kvenvolden, K.A., 2000. Gas hydrate and humans. *Annals of the New York Academy of Sciences*, 912: 17-22. Doi: 10.1111/j.1749-6632.2000.tb06755.x.
- Lacasse, S., 1995. Statistical treatment of CPT data. International symposium on cone penetration testing. Technical papers. Swedish Geotechnical Society, 627 (2): 369-377.
- Lafuerza, S., Casamor, J.L., Canals, M., Devincenzi, J.M., 2004. Stratigraphy and sedimentology of the Llobregat Delta from geotechnical measurements. A "Ultra high-resolution studies of prodelta systems", 32nd International Geological Conference, Florència, T15.06 (312).
- Lafuerza, S., Sultan, N., Canals, M., Frigola, J., Berné, S., Jouet, G., Galavazi, M., Sierro, F.J., 2009. Overpressure within upper continental slope sediments from CPTU data, Gulf of Lion, NW Mediterranean Sea. *International Journal of Earth Sciences*, 98 (4): 751–768. Doi: 10.1007/s00531-008-0376-2.
- Lambeck, K., Chappell, J., 2001. Sea level changes during last glacial cycle. *Science*, 292: 679-686.
- Lastras, G., 1999. Inventario de movimientos

- de masa submarinos en el Mediterráneo. Treball de Fi de Carrera. Facultat de Geologia, Universitat de Barcelona, Barcelona. Pp. 104.
- Lastras, G., 2004. Esllavissaments submarins recents en el marge de l'Ebre. Tesis Doctoral. Universitat de Barcelona, Barcelona. Pp. 222.
- Lastras, G., Canals, M., Hughes-Clarke, J.E., Moreno, A., De Batist, M., Masson, D.G. i Cochonat, P., 2002. Seafloor imagery of the BIG'95 debris flow, Western Mediterranean. *Geology*, 30 (10): 871-874.
- Lastras, G., Canals, M., Urgeles, R., Hughes-Clarke, J.E., Acosta, J., 2004. Shallow slides and pockmark swarms in the Eivissa Channel, Western Mediterranean Sea. *Sedimentology*, 51 (4): 837-850.
- Lastras, G., Canals, M., Amblas, D., Ivanov, M., Dennielou, B., Droz, L., Akhmetzhanov, A., the TTR-14 Leg 3 Cruise Scientific Party, 2006. Eivissa slides, western Mediterranean Sea: morphology and processes. *Geo-Marine Letters*, 26(4): 225-233.
- Lastras, G., Canals, M., Amblas, D., Frigola, J., Urgeles, R., Calafat, A.M., Acosta, J., 2007. Slope instability along the northeastern Iberian and Balearic continental margins. *Geologica Acta*, 5 (1): 35-47.
- Larrasoaña, J.C., Roberts, A.P., Rohling, E.J., 2008. Magnetic susceptibility of eastern Mediterranean marine sediments as a proxy for Saharan dust supply? *Marine Geology*, 254: 224-229.
- La Violette, P.E., Tintoré, J., Font, J., 1990. The surface circulation of the Balearic Sea. *Journal Geophysical Research*, 98: 1377-1398.
- Lee, M-W., 2004. Elastic velocities of partially gas-saturated unconsolidated sediments. *Marine and Petroleum Geology*, 21: 641-650. Doi:10.1016/j.marpetgeo.2003.12.004.
- Lee, H., Locat, J., Desgagnés, P., Parsons, J.D., Mcadoo, B-G., Orange, D., Puig, P., Wong, F-L., Dartnell, P. and Boulanger, E., 2007. Submarine mass movements on continental margins. *A Continental margin sedimentation: from sediment transport to sequence stratigraphy*. Ed. I. Jarvis, International Association of Sedimentologists, special publication, 37: 213-274.
- Liao, T., Mayne, P. W., Tuttle, M. P., Schweig, E. S. and Van Arsdale, R. B., 2002. CPT site characterization for seismic hazards in the New Madrid seismic zone. *Soil Dynamics and Earthquake Engineering*, 22: 943-950.
- Liquete, C., Canals, M., De Mol, B., De Batist, M., Trincardi, F., 2008. Quaternary stratal architecture of the Barcelona prodeltaic continental shelf (NW Mediterranean). *Marine Geology*, 250: 234-250.
- Loncke, L., Mascle, J., Fanil Scientific Parties., 2004. Mud volcanoes, gas chimneys, pockmarks and mounds in the Nile deep-sea fan (Eastern Mediterranean): geophysical evidences. *Marine and Petroleum Geology*, 21: 669-689.
- Loncke, L., Gaullier, V., Mascle, J., Vendeville, B. Camera, L., 2006. The Nile Deep Sea Fan: An example of interacting sedimentation, salt tectonics, and inherited subsalt paleotopographic features. *Marine and Petroleum Geology*, 23: 297-315.
- Loncke, L., Gaullier, V., Droz, L., Ducassou, E., 2009. Multi-scale instabilities along the Nile deep-sea fan, egyptian margin: a general overview. *Marine and Petroleum Geology*, 26: 633-646.
- Long, H., Flemings, P.B., Germaine, J.T., 2007. Interpreting in situ pressure and hydraulic properties with borehole penetrometers in ocean drilling: DVTPP and Piezoprobe deployments at southern Hydrate Ridge, offshore Oregon. *Journal of Geophysical Research*, 112, B04101. Doi:10.1029/2005JB004165.
- Lourens, L.J., Hilgen, F.J., Gudjonsson, L., Zachariasse, W.J., 1992. Late Pliocene to early Pleistocene astronomically forced sea surface productivity and

- temperature variations in the Mediterranean. *Marine Micropaleontology*, 19: 49-78.
- Lourens, L.J., Hilgen, F.J., 1997. Long-periodic variations in the earth's obliquity and their relation to third-order eustatic cycles and late Neogene glaciations. *Quaternary International*, 40: 43-52.
- Lowe, J.J, Walker, M.J., 1984. *Reconstructing Quaternary environments*. Ed. Longman New York. Pp. 389.
- Lunne, T., Robertson, P.K., Powell, J.J.M., 1997. *Cone Penetration Testing in geotechnical practice*. Blackie Academic/EF Spon, Rutledge Publishing Company. Pp. 312.
- Lunne, T., Berre, T., Andersen, K.H., Strandvik, S., Sjøruse, M., 2006. Effects of sample disturbance and consolidation procedures on measured shear strength of soft marine Norwegian clays. *Canadian Geotechnical Journal*, 43: 726-750.
- Magara, K., 1978. *Compaction and fluid migration*. Practical petroleum geology. Developments in Petroleum Science 9, Elsevier, Amsterdam. Pp. 319.
- Maillard, A., Mauffret, A., 1999. Crustal structure and riftogenesis of the Valencia Trough (north-western Mediterranean Sea). *Basin Research*, 11: 357-379.
- Maldonado, 1985. Evolution of the Mediterranean Basins and a detailed reconstruction of the Cenozoic Paleogeography in the Western Mediterranean, in *Western Mediterranean*, Ed. R. Margalef, Pergamon Press, Oxford. Pp. 17-59.
- Manzano, M., 1986. Estudio sedimentológico del prodelta holoceno del Llobregat. Thesis. Universitat de Barcelona, Barcelona. Pp. 150.
- Marquès, M.A., 1974. Las formaciones cuaternarias del delta del Llobregat. Tesi Doctoral, Universitat de Barcelona, Barcelona. Pp. 401.
- Masclé, J., Zitter, T., Bellaiche, G., Droz, L., Gaullier, V., Loncke, L., Prismsed Scientific Party., 2001. The Nile deep sea fan: preliminary results from a swath bathymetry survey. *Marine and Petroleum Geology*, 18: 471-477.
- Masclé, J., Sardou, O., Loncke, L., Migeon, S., Caméra, L., Gaullier, V., 2006. Morphostructure of the Egyptian continental margin: insights from swath bathymetry surveys. *Marine Geophysical Researches*, 27: 49-59.
- Mauffret, A., Pascal, G., Maillard, A., Gorini, C., 1995. Tectonics and deep structure of the north-western Mediterranean Basin. *Marine and Petroleum Geology*, 12 (6): 645-666.
- Mayne, P.W., 2007. *Cone Penetrating Testing*. National Cooperative Highway Research Program, Transportation Research Board. Pp. 118. ISBN 978-0-309-09784-0.
- McCave, I.N., Manighetti, B., Robinson, G., 1995. Sortable silt and fine sediment size/composition slicing: parameters for paleocurrent speed and paleoceanography. *Paleoceanography*, 10 (3): 593-610.
- McClusky, S., Balassanian, S., Barka, A., Demir, C., Ergintav, S., Georgiev, I., Gurkan, O., Hamburger, M., Hurst, K., Kahle, H., Kastens, K., Kekelidze, G., King, R., Kotzev, V., Lenk, O., Mahmud, S., Mishin, A., Nadariya, M., Ouzounis, A., Paradisis, D., Peter, Y., Prilepin, M., Reilinger, R., Sanli, I., Seeger, H., Tealeb, A., Toksöz, M.N., Veis, G., 2000. GPS constraints on plate kinematics and dynamics in the eastern Mediterranean and Caucasus. *Journal of Geophysical Research*, 105: 5695-5719.
- Medimap Group, 2005. *Morpho-bathymetry of the Mediterranean Sea*. CIESM/IFREMER special publication, Atlases and Maps, two maps at 1/2 000 000.
- Meunier, A., 2005. *Clays*. Springer, Berlin. Pp. 472. ISBN 3-540-21667-7.
- Meunier, J., Sultan, N., Jegou, P., Harmegnies, F., 2005. The Penfeld Seabed Penetrometer. IEEE Conference and Exhibition. Brest. Pp. 1309-1314.
- Millot, C., 1999. Circulation in the Western

- Mediterranean Sea. *Journal of Marine Systems*, 20: 423-442.
- Mitchell, J.K., 1976. *Fundamentals of soil behaviour*. John Wiley & Sons, Inc. New York. Pp 422.
- Mitchell, J.K., Soga, K., 2005. *Fundamentals of soil behavior*. 3<sup>rd</sup> ed. John Wiley & Sons, New Jersey. Pp. 559. ISBN-13: 978-0-471-46302-7.
- Moore, R., Usher, N., Evans, T., 2007. Integrated multidisciplinary assessment and mitigation of west Nile Delta geohazards. *Proceedings of the 6<sup>th</sup> International offshore site investigation and geotechnics conference: confronting new challenges and sharing knowledge*, London. Pp. 33-42.
- Moran, K., Hill, P.R. and Blasco, S.M., 1989. Interpretation of piezocone penetrometer profiles in sediment from the Mackenzie through, Canadian Beaufort Sea. *Journal of Sedimentary Petrology*, 59 (1): 88-97.
- Mulder, T., Savoye, B. i Syvistki, J.P.M., 1997. Numerical modelling of a mid-sized gravity flow: the 1979 Nice turbidity current (dynamics, processes, sediment budget and seafloor impact). *Sedimentology*, 44 (2): 305–326.
- Muñoz, A., Lastras, G., Ballesteros, M., Canals, M., Acosta, J., Uchupi, E., 2005. Sea floor morphology of the Ebro Shelf in the region of the Columbretes Islands, Western Mediterranean. *Geomorphology*, 72: 1-18.
- Nadim, F., 1988. Geotechnical site description using stochastic interpolation. 10th Nord. Geotek. Oslo, Norway (May 1988). Pp. 158-161.
- Nafe, J.E., Drake, C., 1957. Variation with depth in shallow and deep water marine sediments of porosity, density and the velocities of compressional and shear waves. *Geophysics*, 22 (3): 523-552.
- Newton, C.S., 2004. Importance of mass transport complexes in the Quaternary development of the Nile Fan, Egypt. *Offshore Technology Conference*, Houston, OTC 16742, 3-6 May.
- Orange, D., García-García, A., Lorenson, T., Nittrouer, C.T., Miserocchi, S., Langone, L., Correggiari, A., Trincardi, F., 2005. Shallow gas and flood deposition on the Po Delta. *Marine Geology*, 222-223: 159-177.
- Ozsoy, E., Hecht, A., Unluata, U., 1989. Circulation and hydrography in the Levantine basin: results from POEM coordinated experiment 1985– 1986. *Progress in Oceanography*, 22: 125–170.
- Paillard, D., Labeyrie, L., Yiou, P., 1996. MacIntosh program performs time-series analysis. *Eos, Transactions, American Geophysical Union*, 77: 379.
- Panieri, G., Camerlenghi, A., Cacho, I., Sánchez Cervera, C., Lafuerza, S., Canals, M., 2009. Foraminifera as “innovative” proxy for seafloor methane emissions: the promising test of Ana slide (Eivissa Channel; Western Mediterranean). 27<sup>th</sup> IAS Meeting, Alghero.
- Peuchen, J., 2000. Deepwater Cone Penetration Tests, OTC 12094, Offshore technology Conference, Houston, Texas, 1-4 May.
- Pinardi, N., Masetti, E., 2000. Variability of the large scale general circulation of the Mediterranean Sea from observations and modelling: a review, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 158: 153-173.
- Polonia, A. Camerlenghi, A., Davey, F., Storti, F., 2002. Accretion, structural style and syn-contractonal sedimentation in the Eastern Mediterranean Sea. *Marine Geology*, 186: 127-144.
- Poulos, H.G., 1998. *Marine Geotechnics*. Unwin Hyman Ltd, London, Pp. 473.
- Rabineau, M., 2001. Un modèle géométrique et stratigraphique des séquences de dépôts quaternaires de la plate-forme du Golfe du Lion: enregistrement des cycles glacioeustatiques de 100 000 ans. Tesis Doctoral, Université de Rennes – Ifremer. Pp. 462. Disponible on-line: <http://www.ifremer.fr/docelec>.

- Rahman, M.S., 1991. Wave-induced instability of seabed: Mechanism and conditions. *Marine Georesources & Geotechnology*, 10 (3): 277-299. Doi: 10.1080/
- Rabineau, M., Berné, S., Ledrezen, E., Lericolais, G., Marsset, T., Rotuno, M., 1998. 3D architecture of lowstand Quaternary sand bodies on the outer shelf of the Gulf of Lions, France. *Marine Petroleum Geology*, 15 (5): 439-452.
- Rabineau, M., Berné, S., Aslanian, D., Olive, J.L., Joseph, P., Guillocheau, F., Bourillet, J.F., Ledrezen, E., Granjeon, D., 2005. Sedimentary sequences in the Gulf of Lion: a record of 100, 000 years climatic cycles. *Marine and Petroleum Geology*, 22: 775–804. Doi:10.1016/j.marpetgeo.2005.03.010
- Ramsey, N., 2002. A calibrated model for the interpretation of cone penetration tests (CPTs) in North Sea Quaternary soils, paper presented at the Offshore site investigation and geotechnics: diversity and sustainability, London, 26-28 November.
- Richter, T.O., Van Der Gaast, S., Koster, B., Vaars, A., Gieles, R., Stitger, H.C., De Haas, H., Van Weering, T.C.E., 2006. The Avaatech XRF Core Scanner: thechnical description and applications to NE Atlantic sediments. A "New Techniques in Sediment Core Analysis", ed. R.G. Rothwell, Geological Society, London, Special Publication. Pp. 39-50. ISBN 0305-8719/06.
- Ridente, D., Trincardi, F., 2002. Eustatic and tectonic control on deposition and lateral variability of Quaternary regressive sequences in the Adriatic basin (Italy). *Marine Geology*, 184: 273-293.
- Robert, C., Chamley, H., 1987. Cenozoic evolution of continental humidity and paleoenvironment, deduced from the kaolinite content of oceanic sediments. *Paleogeography, Paleoclimatology, Paleocology*, 60: 171-187.
- Robertson, P.K., 1990. Soil classification using the cone penetration test. *Canadian Geotechnical Journal*, 27: 151-158.
- Robertson, P.K., Campanella, R.G., Gillespie, D., Grieg, P., 1986. Use of piezometer cone data. Proceedings, In-Situ '86, ASCE Specialty Conference, Blacksburg, VA.
- Robertson, P.K., Lunne, T. and Powell, J., 1996. Applications of penetration tests for geo-environmental purposes. *Advances in site investigation practice*. Thomas Telford (Ed.), London. Pp. 407-420.
- Roca, E., Sans, M., Cabrera, L., Marzo, M., 1999. Oligocene to Middle Miocene evolution of the central Catalan margin (northwestern Mediterranean). *Tectonophysics*, 315: 209-233.
- Rogerson, M., Cacho, I., Jimenez-Espejo, F., Reguera, M.I., Sierro, F.J., Martinez-Ruiz, F., Frigola, J., Canals, M., 2008. A dynamic explanation for the origin of the western Mediterranean organic-rich layers. *Geochemistry Geophysics Geosystems*, 9, Q07U01. Doi:10.1029/2007GC001936.
- Rohling, E.J., Abu.Zied, R., Casford, J.S.L., Hayes, A., Hoogakker, B.A.A, 2007. The Mediterranean Sea: present and past. Ed. A.J.C. Woodward, *The Physical Geography of the Mediterranean*. Oxford University Press: 33-67.
- Rothwell, R.G., Thomson, J., Kähler, G., 1998. Low-sea-level emplacement of a very large Late Pleistocene 'megaturbidite' in the western Mediterranean Sea. *Nature*, 392: 377-380.
- Rowell, A., 2007. Climate change will disrupt US oil production. Oil change International, 19 Octubre, <http://priceofoil.org/>.
- Salvadó, J.A., Durrieu de Madron, X., Grimalt, J.O., Pascual, C., Calafat, A.M., Canals, M., Heussner, S., 2009. Distribution of organochlorine pollutants in superficial sediments of the Gulf of Lions. 4<sup>th</sup> HERMES Annual Meeting, Faro, Portugal, Abstr. vol., p. 103.
- Sánchez-Cabeza, J.A., Masqué, P., Ani-Ragolta, I., Merino, J. Alvisi, F., Palanques, A., Puig, P., 1999. Sediment

- accumulation rates in the southern Barcelona continental margin (NW Mediterranean Sea) derived from  $^{210}\text{Pb}$  and  $^{137}\text{Cs}$  chronology. *Progress in Oceanography*, 44: 313-332.
- Sandler, A., Herut, B., 2000. Composition of clays along the continental shelf off Israel: contribution of the Nile versus local sources: *Marine Geology*, 167: 339-354.
- Santesteban, J.I., Mediavilla, R., López-Pamo, E., Dabrio, C.J., Ruiz Zapata, M.B., Gil García, M.J., Castaño, S., Martínez-Alfaro, P.E., 2004. Loss on ignition: a qualitative or quantitative method for organic matter and carbonate mineral content in sediments? *Journal of Paleoclimatology*, 32: 287-299.
- Shepard, F.P., Phleger, F.B. and Van Andel, T.H., 1960. Recent sediments, Northwest Gulf of Mexico. *American Association of Petroleum Geologists*. Pp. 394.
- Sidall, M., Rohling, E.J., Almog-Labln, A., Hemleben, Ch., Melschner, D., Schmelzer, I., Smeed, D.A., 2003. Sea-level fluctuations during the last glacial cycle. *Nature*, 423: 853-858.
- Sidall, M., Chappell, J., Potter, E.K., 2007. Eustatic sea level during past interglacials. Eds. F. Sirocko, T. Litt, M. Claussen, M.F. Sánchez-Goñi. *The Climate of Past Interglacials*. Elsevier, Amsterdam. Pp. 75-92.
- Sierro, F.J., Hodell, D.A, Curtis, J.H, Flores J.A, Reguera, I., Colmenero-Hidalgo, E., Bárcena, M.A., Grimalt, J.O., Cacho, I., Frigola, J., Canals, M., 2005. Impact of iceberg melting on Mediterranean thermohaline circulation during Heinrich events. *Paleoceanography*, 20 (2). PA2019. Doi: 0.1029/2004PA001051.
- Sierro, F.J., Flores, J.A., Pérez-Folgado, M., González-Mora, B., Bárcena, M.A., Dennielou, B., Berné, S., 2006. Condensed layers and sea level changes in the Gulf of Lions during the last climatic cycles (data from Promess1, borehole PRGL1-4). *Geophysical Research Abstracts*, EGU06-A-09028.
- Silva, A.J., Jordan, S.A., 1984. Consolidation properties and stress history of some deep sea sediments, in *Seabed Mechanics*, ed. Brice Denness, Graham & Trotman, Boston. Pp. 26-38.
- Silva, A., Bryant, W.R., 2000. Jumbo piston coring in deep water Gulf of Mexico for seabed geohazard and geotechnical investigations. *Proceedings 10th International Offshore Polar Engineering Conference*, Seattle. Vol 1: 424-433.
- Skirris, N., Laskaratos, A., 2004. Impacts of the Nile River damming on the thermohaline circulation and water mass characteristics of the Mediterranean Sea. *Journal of Marine Systems*, 52: 121-143.
- Solheim, A., Berg, K., Forsberg, K., Bryn, P., 2005. The Storegga Slide complex: repetitive large scale sliding with similar cause and development. *Marine Petroleum Geology*, 22: 97-107.
- Somoza, L, Barnolas, A., Arasa, A., Maestro, A., Rees, J.G., Hernández-Molina, F.J., 1998. Architectural stacking patterns of the Ebro delta controlled by Holocene high-frequency eustatic fluctuations, delta-lobe switching and subsidence processes. *Sedimentary Geology*, 117: 11-32.
- Stanley, D.J., Liyanage, A.N., 1986. Clay-mineral variations in the northeastern Nile Delta, as influenced by depositional processes. *Marine Geology*, 73: 263-283.
- Stanley, D.J., Warne, A.G., 1994. Worldwide initiation of Holocene marine deltas by deceleration of sea level rise. *Science*, 265: 228-231.
- Stanley, D.J., Wingerath, J.G., 1996. Nile sediment dispersal altered by the Aswan High Dam: the kaolinite trace. *Marine Geology*, 133: 1-9.
- Sterling, G.H., Strohbeck, G.E., 1975. The Failure of the South Pass 70 Platform B in Hurricane Camille. *Journal of Petroleum Technology*, 27 (3): 263-268.
- Strout, J.M., Tjelta, T.I., 2005. In situ pore pressures: what is their significance and



- how they can be reliable measured? *Marine and Petroleum Geology*, 22: 275-285.
- Sultan, N., Cochonat, P., Dennielou, B., Bourillet, J.F., Savoye, B., Colliat, J.L., 2000. Surconsolidation apparente et pression osmotique dans un sédiment marin. *Earth and Planetary Sciences*, 331: 379-386.
- Sultan, N., Cochonat, P., Canals, M., Cattaneo, A., Dennielou, B., Hafliadason, H., Laberg, J.S., Long, D., Mienert, J., Trincardi, F., Urgeles, R., Vorren, T.O., Wilson, C., 2004. Triggering mechanisms of slope instability processes and sediment failures on continental margins: a Geotechnical approach. *Marine Geology*, 213: 291-321.
- Sultan, N., Voisset, M., Marsset, M., Cauquil, E., Colliat, J.L., 2007a. Potential role of compressional structures in generating submarine slope failures in the Niger Delta. *Marine Geology*, 237: 169-190.
- Sultan, N., Gaudin, M., Berné, S., Canals, M., Urgeles, R., Lafuerza, S., 2007b. Analysis of slope failures in submarine canyon heads: An example from the Gulf of Lions. *Journal Geophysical Research*, 112: F01009. Doi:10.1029/2005JF000408.
- Tanaka, H., Ritoh, F., Omukai, N., 2002. Quality of samples retrieved from great depth and its influence on consolidation properties. *Canadian Geotechnical Journal*, 39: 1288-1301.
- Taylor, D.W., 1948. *Fundamentals of Soil Mechanics*, Wiley, New York. Pp. 700.
- Terzaghi, K., 1943. *Theoretical Soil Mechanics*, Wiley, New York. Pp. 528.
- Terzaghi, K., Peck, R.B., Mesri, G., 1996. *Soil mechanics in engineering practice*. 3<sup>rd</sup>. Ed. John Wiley & Sons. New York. Pp. 549. ISBN: 0-471-08658-4.
- Tesson, M., Posamentier, H.W., Gensous, B., 2000. Stratigraphic organization of Late Pleistocene deposits of the western part of the Rhone shelf (Languedoc shelf) from high resolution seismic and core data. *American Association of Petroleum Geologists Bulletin* 84(1): 119-150.
- Thiry, M., 2000. Paleoclimatic interpretation of clay minerals in marine deposits: an outlook from the continental origin. *Earth Science Reviews*, 49: 201-221.
- Tzedakis, P.C., 2007. Seven amiguities in the Mediterranean palaeoenvironmental narrative. *Quaternary Science Reviews*, 26: 2042-2066.
- UNEP/MAP/MED POL 2003. Riverine transport of water, sediments and pollutants to the Mediterranean Sea. MAP Technical Report series, 141, UNEP/MAP Athens. Pp 111.
- Urgeles, R., De Mol, B., Liqueste, C., Canals, M., Hughes-Clarke, J.E., Arraix Shipboard Party, 2007. Sediment undulations on the Llobregat prodelta: Signs of early slope instability or sedimentary bedforms? *Journal of Geophysical Research*, 112: B05102. Doi: 10.1029/2005JB003929.
- Vandré, C., Cramer, B., Gerling, P., and Winsemann, J., 2007. Natural gas formation in the western Nile delta (Eastern Mediterranean): Thermogenic versus microbial, *Organic Geochemistry*, 38: 523-529.
- Venkatarathnam, K., Ryan, W.B.F., 1971. Dispersal patterns of clay minerals in the sediments of the Eastern Mediterranean Sea. *Marine Geology*, 11: 261-282.
- Wigger, S., Bailey, J., Larsen, M., Wallace, M., 1997. Ha'py field: a pliocene bright spot example from the Nile Delta, Egypt: *The Leading Edge*, 1827-1829.