

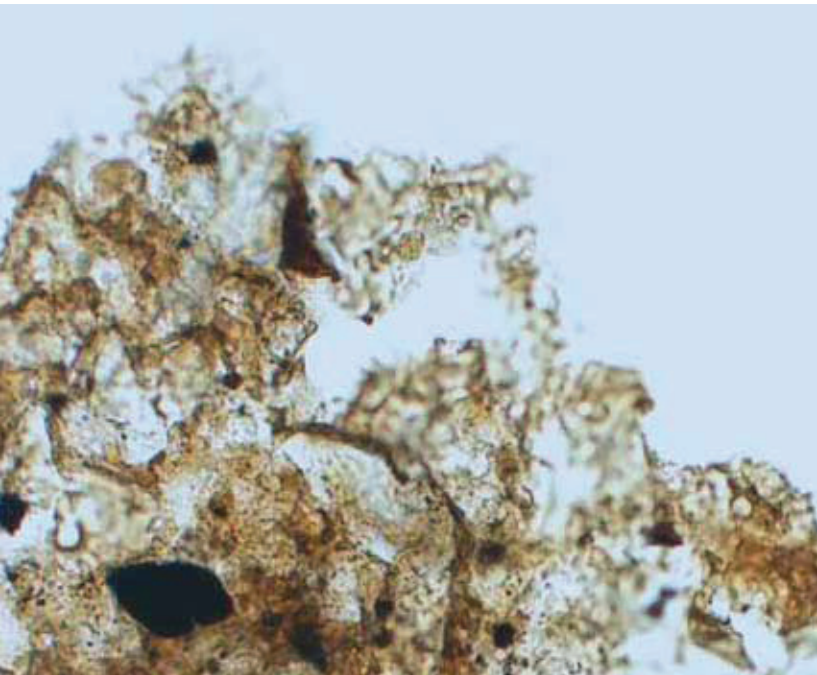


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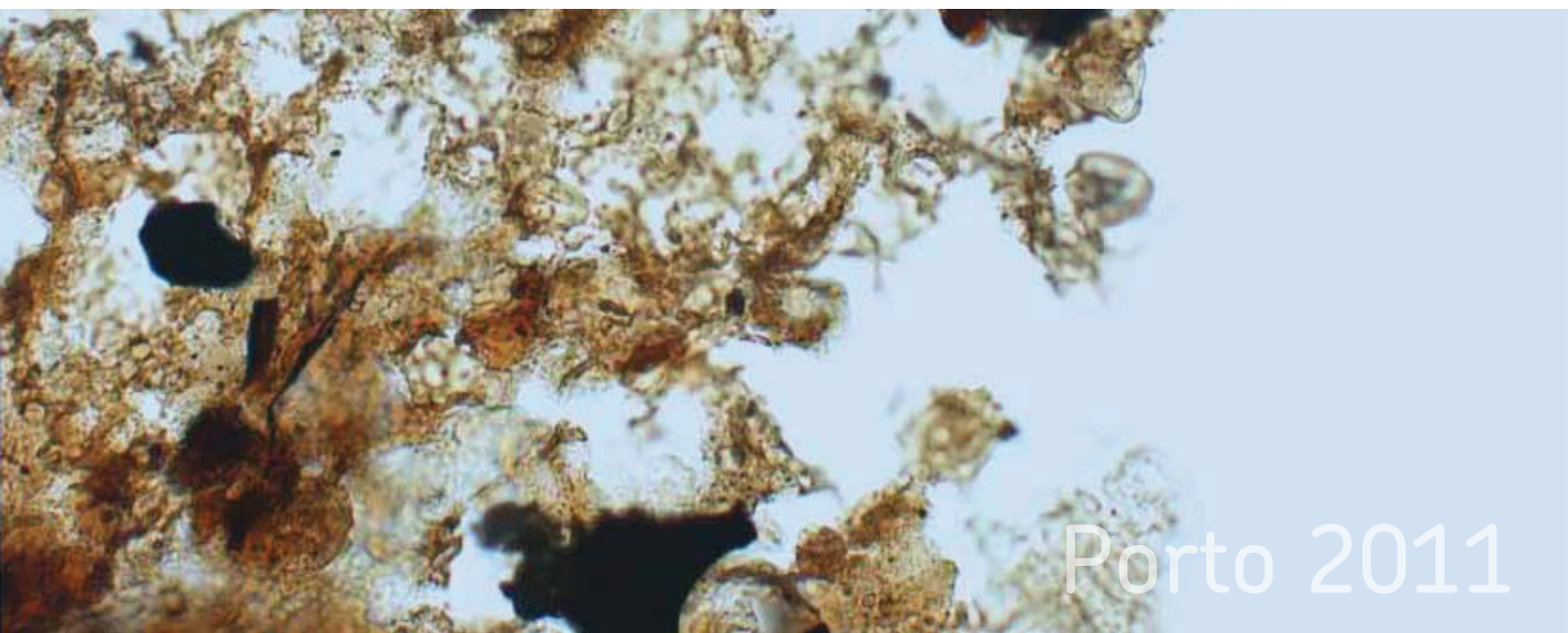
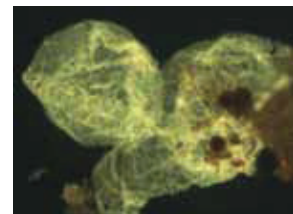
Departamento de Geociências,  
Ambiente e Ordenamento do Território



# MEMÓRIAS nº17

## 63<sup>rd</sup> Annual Meeting of the International Committee for Coal and Organic Petrology

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nº17

**63<sup>rd</sup>** Annual Meeting of the  
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Coal and Organic Petrology

DEOLINDA FLORES AND MANUELA MARQUES, EDITORS

## Organizing Committee

**Deolinda Flores** - [dflores@fc.up.pt](mailto:dflores@fc.up.pt)

**Manuela Marques** - [maarques@fc.up.pt](mailto:maarques@fc.up.pt)

**Bruno Valentim** - [bvvalent@fc.up.pt](mailto:bvvalent@fc.up.pt)

**Joana Ribeiro** - [joanaribeiro@fc.up.pt](mailto:joanaribeiro@fc.up.pt)

**Sandra Rodrigues** - [sandra.rodrigues@fc.up.pt](mailto:sandra.rodrigues@fc.up.pt)

**Cândida Garcia** - [cgarcia@fc.up.pt](mailto:cgarcia@fc.up.pt)

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## Preface

The one and half day field trip on **“The Lower Jurassic of the west coast of Portugal: Stratigraphy and organic matter in carbonate sedimentation”** will take place on the 10-11<sup>th</sup> September. This excursion was organized for both the “ICCP Training Course on Dispersed Organic Matter” and the “63<sup>rd</sup> Annual Meeting of the International Committee for Coal and Organic Petrology-ICCP”. It is therefore a post-ICCP course and a pre-ICCP meeting excursion.

On the first day, 10<sup>th</sup> September, we will leave Porto after lunch in the direction of Óbidos (about 245km) for a sightseeing visit to this town, located on a hilltop, and encircled by a fortified wall. Óbidos remains a well-preserved example of medieval architecture; its streets, squares, walls and its castle are a popular tourist destination. Dinner and overnight stay will be at the Praia Norte Hotel, Peniche.

On the second day, 11<sup>th</sup> September, the first stop will be Peniche Peninsula to visit the most emblematic place of the Portuguese coast. We will observe a complete sequence of the Lower Jurassic of the Lusitanian Basin, which is the most studied area of this basin for potential hydrocarbon generation and is also an international reference, as it is the only candidate to the Pliensbachian-Toarcian stratotype.

The second stop will be Sítio, Nazaré, where we should enjoy the beautiful landscape of the picturesque beach of Nazaré, the most famous fishing town of Portugal. It will also be site of a Jurassic and Cretaceous sequence that outcrops in the cliff.

Thereafter we will drive to S. Pedro de Moel for lunch at Cervejaria Camões, with picturesque views over the beach. At the last stop we will visit the Jurassic Calcareous cliffs of S. Pedro de Moel, where the thickest succession of marl-limestone rich in organic matter outcrops, as well as other sedimentary geological structures, as unique examples of fossilized marine invertebrates will be observed.

The field trip will be guided by Luis Duarte and Ricardo Silva from Coimbra University, and João Graciano from Federal University of Rio de Janeiro. The Organizing Committee would like to express their gratitude for all the effort they have put into preparing this field trip guide. A special thanks is extended to Luís Duarte, who has from the very start been available to assist with all the logistical aspects associated with the organization of this field trip.

Finally, we will return to Porto, joining the other ICCP participants at the Vinho Verde Ice Break Party that will take place in a pleasant setting, the Casa do Vinho Verde, overlooking the Douro River.

We hope that you will have an enjoyable tour!

The Organizing Committee



## The Lower Jurassic of the west coast of Portugal: stratigraphy and organic matter in carbonate sedimentation

Luís V. Duarte<sup>1</sup>, Ricardo L. Silva<sup>1</sup>, J. G. Mendonça Filho<sup>2</sup>

<sup>1</sup> Universidade de Coimbra, Departamento de Ciências da Terra and IMAR-CMA, Faculdade de Ciências e Tecnologia, Largo Marquês de Pombal, 3000-272 Coimbra, Portugal. lduarte@dct.uc.pt; ricardo.silva@student.dct.uc.pt

<sup>2</sup> Laboratório de Palinofácies & Fácies Orgânica, IGEO/UFRJ, Cidade Universitária. CEP: 21949-900, Ilha do Fundão, Rio de Janeiro, Brasil. graciano@geologia.ufrj.br

### I. General Introduction

One of the most expressive record of the Early Jurassic time interval is observed in the Lusitanian Basin (hereinafter referred as LB), located on the occidental sector of the Iberian Peninsula, mostly corresponding to a thick marine carbonated series (Soares et al., 1993; Azerêdo et al., 2003; Duarte, 2004, 2010b; Duarte et al., 2004b). Part of this succession, namely the interval comprised between the Sinemurian and the Toarcian Stages, is dominated by marl–limestone alternations. According to the lithostratigraphic scheme proposed by Duarte and Soares (2002) for the Central/North sector of the basin, this time span includes the Coimbra, Água de Madeiros, Vale das Fontes, Lemedo, S. Gião and its lateral equivalents, the Cabo Carvoeiro and Prado formations. In recent years, these units have been the focus of intense scientific activity, related to Sedimentology, Stratigraphy and Geochemistry (e.g. elemental, carbon and oxygen stable isotopes and organic geochemistry). The specificity of the Sinemurian and Pliensbachian sedimentation, rich in organic matter (OM), and the observed sedimentological changes between the Pliensbachian and the Middle Toarcian (see Duarte, 1997, 2007), have been the ground for several publications, mostly on a chemostratigraphic, palaeoceanographic and palaeoenvironmental perspective (e.g. Duarte, 1997, 1998, 2010a, 2010b; Duarte et al., 2004a, 2004b, 2005, 2007, 2010a, 2010b, 2011; Oliveira et al. 2005, 2006, 2007, 2009; F. Silva et al., 2006, 2007, 2010; Hesselbo et al. 2007; Rocha, 2007; Suan et al., 2008a, 2008b, 2010; Matioli et al., 2009; R. Silva et al., 2009, 2010a, 2010b, 2010c, 2010d, 2011a, 2011b, 2011c; Azerêdo et al., 2010; Ferreira et al., 2010a, 2010b; Reggiani et al., 2010a, 2010b; Poças Ribeiro et al., 2011a, 2011b). Some of these works have a worldwide impact, specifically those associated with the Toarcian Oceanic Anoxic Event. This importance is clearly enhanced due to the high quality of the outcrops and to the privileged palaeogeographic location of the LB, between the Atlantic and Tethyan domains (Figure I.1).

Several outcrops of the LB are of major importance for the scientific knowledge and study of the Lower Jurassic (Duarte and Soares, 2002; Duarte, 2004). In this context, and considering the importance and role of the OM in the sedimentation dynamics during this time interval, for this field trip is proposed the examination of the Peniche and Água de Madeiros (S. Pedro de Moel area) sections (Figure I.2). These two locations constitute worldwide references for the study of Lower Jurassic, from the palaeoenvironmental to oil generation perspective, complemented by an important geological heritage and spectacular scenic environment (Duarte, 2004, 2005). In addition to the observation of the different sedimentary characteristics, it will be presented and discussed several aspects of organic (Total Organic Carbon, Rock-Eval pyrolysis, Palynofacies and Biomarkers) and isotopic (carbon and oxygen stable isotopes) geochemistry. Based on an extensive knowledge on