

# **Web-based Outcrop Digital Analog Database (WODAD): Archiving Carbonate Platform Margins\***

By  
**J.A.M. Kenter<sup>1</sup> and P.M. Harris<sup>2</sup>**

Search and Discovery Article #40300 (2008)

Posted August 15, 2008

\*Adapted from oral presentation at AAPG Annual Convention, Houston, Texas, April 9-12, 2006. See companion article, "WODAD - A Web-Based Outcrop Digital Analog Database of Carbonate Platform Margins," Search and Discovery Article #40308 (2008).

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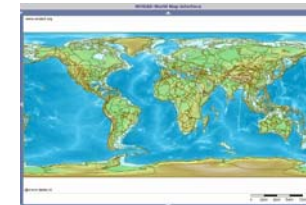
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## **Abstract**

The lack of coherent and public data bases on outcrop data counterbalanced by the shared academic and industry need for such information has initiated the Web-Based Outcrop Digital Analog Database (WODAD). This public, searchable, database is a serious attempt to make outcrop information more readily available to earth scientists. Such analogs can help professionals to conceptualize stratigraphic, facies and diagenetic relationships that develop reservoirs and traps while it may provide academics with a tool to compare and contrast information across geological time and space.

WODAD will cover the Phanerozoic and include carbonates initially, but later clastics as well as mixed systems. The database consists of a series of chapters, each focusing on a specific outcrop. Each chapter contains a summary page with search items, a few (2-3) pages of descriptive information, and a short reference list. A section of each summary page contains the items that will eventually guide the search. The primary search items will be age, system type (for carbonate, platform type), rock properties (lithology, texture), overprint (recrystallization, fracture, karst), and geographical location.

The database will offer unique and unsurpassed opportunities for comparative research, many of which will be only discovered once the database is available. WODAD "carbonates" is currently operational thanks to start-up funding provided by Chevron. Outcrop contributions from academia and industry are invited through submission of an abstract as well as through personal invitations (see [wodad.org](http://wodad.org) for information and instructions). It is anticipated that by 2007 the database will be published as a digital publication.



# Web-based Outcrop Digital Analog Database (WODAD): Archiving Carbonate Platform Margins

**Jeroen AM Kenter and P Mitch Harris**

*Chevron Energy Technology Company, San Ramon, California, U.S.A*

**Web-based Outcrop Digital Analog Database**

## Information on Outcrops

- ✓ Is generally poorly accessible; no systematic (semi) quantitative catalog exists in the public domain
- ✓ Is essential to the Earth Science community for contrast-comparative and background research
- ✓ Outcrops analogs are an important part of any hydrocarbon or water exploration or development project (conceptualize relationships that develop reservoirs and traps; limit and constrain uncertainties and need to standardization)
- ✓ 53-56% booked reserves in carbonates and 25-35% of that depleted by 2009

# However, matching analogs



- ✓ Are difficult to locate since no uniform catalog exists
- ✓ Often lack reliable, appropriate, coherent and “contrast-comparable” information (journals)
- ✓ Academics speak different geologic language than reservoir engineers and geologists

# WODAD aims to provide



- ✓ A public “searchable” and “relational” digital outcrop analog database (web-based - downloadable)
- ✓ Including a set of key qualitative and quantitative variables that allow cross-variable queries
- ✓ Covering the Phanerozoic
- ✓ Including carbonates, clastics and mixed systems
- ✓ A database compatible with C&C Reservoirs Digital Analog System
- ✓ Published as digital AAPG publication where the contributors are co-authors

# WODAD:



- ✓ Will function as a dynamic web-based database
- ✓ Is based on a combination of PHP and PostgreSQL; open source licensed packages keeps the database at a relative low cost level
- ✓ Is hosted with public university that has latest facilities and back-up systems
- ✓ PHP (Hypertext Preprocessor) is server-side web-scripting language and connecting Web sites to back end servers (two-way communication), such as databases. This enables the following types of two-way communication
- ✓ PostgreSQL is an Object Relational Database which excels at handling large media objects, tables, spatial, and series style data sets

# WODAD Properties:



- ✓ Fully searchable data base (functionality in progress)
- ✓ Open call for participants as well as invited contributions
- ✓ Pre-formatted pull down menus to ensure coherent information
- ✓ Simple primary search items like age, system type, rock properties, overprint, and geographical location; Information items short descriptions
- ✓ GIS based using Basin World Map
- ✓ Digital and analog data can be added as new items

# Publicly visible WODAD



## Web-based Outcrop Digital Analog Database

HOME

Info

Main

Login

Sign Up

About

Contact

**MAIN**

**Note:** Make sure your browser allows the use of cookies and javascript, WODAD.ORG can only perform correctly when both are enabled. Both options can be found under [Tools](#) -> [Options](#) (for most browsers).

**Web-based Outcrop Digital Analog Database (WODAD):**  
**"A Public Relational and Searchable Database Archiving Geological Outcrops in the Geological Record"**

Information on geological outcrops is generally poorly accessible in the literature and no systematic (semi) quantitative catalog exists in the public domain. However, such information is essential to the Earth Science community for comparative and background research and similarly outcrop analogs are an important part of any hydrocarbon or water exploration or development project. Analogs provide information to supplement what is available from the academic or industry project's data set and thereby often add significantly to one's understanding and interpretation. Specifically, analogs help to conceptualize stratigraphic, facies and diagenetic relationships that develop reservoirs and traps. The range of scenarios that analogs can help to illustrate is particularly important when uncertainties are of a concern and need to be quantified.


This relational database will 1) cover the Phanerozoic, 2) include carbonates, siliciclastics as well as mixed systems and, 3) maximize the searchable parameters. This way (ideally), the database will be searchable from any angle and not necessarily by age or system type alone. The database will offer earth scientists unique and unsurpassed opportunities for comparative research, many of which will be only discovered once the database is available.


WODAD is hosted at the Vrije Universiteit in Amsterdam and is partly funded by ChevronTexaco. The web-based database has been operational since January 2006 and contributions are invited from academia and industry through personal invitations or through submission of unsolicited (short) abstracts to the web site. Independent referees review contributions before they are accepted for publication. The first of three databases will focus on carbonate outcrops and (digital) publication with a major journal is planned for early 2008.


**Online Members**

J. Kenter

**Main Supporters**

  
vrije Universiteit  
amsterdam





E-mail

jeroenkenter@chevron.com

Password

.....

Login

Forgot your password, please click here.

[Top]

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2006

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# Registration WODAD



## Web-based Outcrop Digital Analog Database

[Home](#) | [Info](#) | [Database](#) | [OPTIONS](#)

Personal Info

[Change Password](#)

[Member Accounts](#)

[Message Board](#)

[FAQ](#)

Quick Search

Online Members

3. Kenter

Main Supporters

### PERSONAL INFO

Below you will find a form containing your personal info, saved in the WODAD database. You can update your info, by replacing the existing information or fill out the still empty fields.

Fields marked with an asterisk \* are required.

Family Name *	<input type="text" value="Kenter"/>	<a href="#">i</a>
First Name *	<input type="text" value="Jeroen"/>	<a href="#">i</a>
E-mail *	<input type="text" value="jeroenkenter@chevron.com"/>	<a href="#">i</a>
Institute/Company *	<input type="text" value="Chevron"/>	
Title	<input type="text" value="Dr"/>	<a href="#">i</a>
Address	<input type="text" value="Appelgaarde 4"/>	
City	<input type="text" value="Voorburg"/>	
Zip/Postal Code	<input type="text" value="2272 TK"/>	
State/Province	<input type="text"/>	
Country	<input type="text" value="Netherlands"/>	
Phone Number	<input type="text" value="+31 70 3572284"/>	<a href="#">i</a>
Fax Number	<input type="text" value="+31 70 3572375"/>	<a href="#">i</a>

# Active Contributors WODAD



## WODAD CONTRIBUTORS

### Administrator(s)

X. van Lanen	Vrije Universiteit Amsterdam
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### Principal Editor(s)

G. Della Porta	Cardiff University
M. Harris	Chevron Energy Technology Company
J. Kenter	Chevron

### Editor(s)

No Editors
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T. Playton	BEG
L. Pomar	please replace for institute name
T. Simo	University of
K. Verwer	Vrije Universiteit
J. Xavier	BEG

# Data Submission – Simple Steps with Pull Down Menus



INSERT/EDIT RECORD: SIERRA DE CUERA (#1)

#1 - Spatial Info - #3 - #4 - #5 - #6 - #7 - #8 - #9 - #10 - #11 - #12 - #13 - #14 - #15 - #16

**i Example** **i Preview**

Coordinates\*  
[Latitude] 43.35145  
[Longitude] -4.79799

Region\*  
Africa  
Antarctica  
Asia  
Australia  
▶ Europe

Country\*  
▶ Spain

Area Name  
Asturias

Sedimentary Basin\*  
Iberian Massif  
Pyrenean Foothills-Ebro ...  
Tajo-Duero Basin  
▶ Spanish Trough-Cantabria...

[Use MapInterface](#) | [Refresh Page](#)

# Spatial Information



INSERT/EDIT RECORD: JBD (#5)

#1 - **Spatial Info** - #3 - #4 - #5 - #6 - #7 - #8 - #9 - #10 - #11 - #12 - #13 - #14 - #15

**i** Example **i** Preview

Coordinates\*

[Latitude]

[Longitude]

Submit

Use MapInterface | Refresh Page

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**Legend**

- ☒ Layer
- ☒ Bathymetry
- ☒ Topography
- ☒ Coastlines
- ☒ Country Borders
- ☐ Major Rivers
- ☐ Country Names
- ☒ Capitals
- ☒ Sedimentary Basins
- ☒ Plot: Basin Names
- ☐ Grid

km mi

Redraw Map

**Background**

Standard WorldMap

Java Mode Disabled  
Click to Enable

**WODAD World Map Interface**

www.wodad.org

Spanish Trough-Cantabrian Zone

Iberian Massif

Tajo-Duero Basin

0 52 104 156 208 km

@www.demis.nl

**Keymap**

500 x 300

0 52 104 156 208 km

**Legend**

- ☒ Layer
- ☒ Bathymetry
- ☒ Topography
- ☒ Coastlines
- ☒ Country Borders
- ☐ Major Rivers
- ☐ Country Names
- ☒ Capitals
- ☒ Sedimentary Basins
- ☒ Plot: Basin Names
- ☐ Grid

km mi

Redraw Map

**Background**

Standard WorldMap

Java Mode Disabled  
Click to Enable

**WODAD World Map Interface**

www.wodad.org

Guerdif Basin

Hauts Basin

Atlas Uplift

Ougarta Uplift

Grand Erg/Ahnet Basin

0 52 104 156 208 km

@www.demis.nl

**Keymap**

500 x 300

0 52 104 156 208 km

**Information**

# Time Interval



INSERT/EDIT RECORD: SIERRA DE CUERA (#1)

#1 - #2 - **Time Interval** - #4 - #5 - #6 - #7 - #8 - #9 - #10 - #11 - #12 - #13 - #14 - #15 - #16

[Example](#) [Preview](#)

Please select the most precise known Geological Time Interval (Lower Boundary - Upper Boundary)

**Serpukhovian** until **Moscovian**

[Previous](#) [Next](#)

# Platform Details



INSERT/EDIT RECORD: SIERRA DE CUERA (#1)

#1 - #2 - #3 - #4 - **Platform Details** - #6 - #7 - #8 - #9 - #10 - #11 - #12 - #13 - #14 - #15 - #16

**i** Example **i** Preview

Platform Type\*

Delta-Top  
Fault-Block  
Offshore Back (or unattached)  
Salt Diapir

Add new category

Foreland Margin

Sedimentary Basin Type

Foreland | Delete

Morphology of Depositional System (plan view)

Amalgated  
Amoeboid  
Arcuate  
Circular

Add new category

Morphology of Depositional System (cross view)

Backstepping  
Hat to Bell shaped (plano-co...  
Inverted bowl/saucer (convex...  
Lenticular

Add new category

Aggradational  
Progradation

Additional System Info  
[max. 25 words]

Seismic scale undisturbed dip section; 5 km horizontal progradation followed by near vertical aggradation; microbial boundstone slope shedding controls depositional flank

Update

Previous

Next

# Rock Properties



INSERT/EDIT RECORD: SIERRA DE CUERA (#1)

#1 - #2 - #3 - #4 - **#5 - Rock Properties** - #7 - #8 - #9 - #10 - #11 - #12 - #13 - #14 - #15 - #16

**Example** Preview

Lithology

Breccia  
Chalk  
Clay  
Conglomerate

Add new category

**Primary Lithology**  
Limestone

**Secondary Lithology**  
Dolomite  
Siliceous Mudstone

Texture

Boundstone  
Grainstone  
Mudstone

Add new category

Microbial Cement Boundstone  
Packstone

Components

Skeletal Grains  
----- Microbes  
----- Calcareous Algae  
----- Calcimicrobes and cyanobacteria  
----- Marine green algae  
----- Charophytus  
----- Red Algae  
----- Phylloid algae  
----- Foraminifers  
----- Agglutinated forms

**Primary Components**  
Calcimicrobes and cyanobacteria  
Marine green algae  
Calcareous benthics

**Secondary Components**  
Brachiopods  
Bryozoans  
Ooids

Overprint

Diagenetic  
Diagenetic - Extensive Re-cr...  
Diagenetic - Karsted  
Diagenetic - Moderate Re-cry...

Add Diagenetic

Add Tectonic

Tectonic - Tilted minor fracturing

Previous

Next

# Physical Properties



INSERT/EDIT RECORD: SIERRA DE CUERA (#1)

#1 - #2 - #3 - #4 - #5 - #6 - **Physical Properties** - #8 - #9 - #10 - #11 - #12 - #13 - #14 - #15 - #16

**i** Example **i** Preview

Rock Mechanics/  
Petrophysics

Permeability

Add new category



Density  
P-wave velocity  
Porosity  
S-wave velocity

Geophysics

2D Seismic  
3D Seismic  
Bouguer Anomaly  
Magnetic Anomaly

Add new category



Synthetic Seismic Model

Previous

Next



# Outcrop Properties



## INSERT/EDIT RECORD: SIERRA DE CUERA (#1)

#1 - #2 - #3 - #4 - #5 - #6 - #7 - **Outcrop Properties** - #9 - #10 - #11 - #12 - #13 - #14 - #15 - #16

**i** Example **i** Preview

Outcrop Structure **Undisturbed** | Delete

Outcrop Exposure **Moderate (>40% exposure and moderately continues)** | Delete

Stratal Anatomy **Superb (visible and continues)** | Delete

Previous

Next

# Object Dimensions



INSERT/EDIT RECORD: SIERRA DE CUERA (#1)

#1 - #2 - #3 - #4 - #5 - #6 - #7 - #8 - **Dimensions** - #10 - #11 - #12 - #13 - #14 - #15 - #16

**i** Example **i** Preview

Platform Dimensions

Dip width  m.

Thickness  m.

Slope Dimensions

Height min  m.

max  m.

Angle min  0

max  0

Slope Shape

Previous

Next

# Additional Information



INSERT/EDIT RECORD: SIERRA DE CUERA (#1)

#1 - #2 - #3 - #4 - #5 - #6 - #7 - #8 - #9 - **Additional Info** - #11 - #12 - #13 - #14 - #15 - #16

[Example](#) [Preview](#)

Historical Application to Subsurface

Aaiun-Tarfaya Basin  
Abu Gharadiq Basin  
Acre Basin  
Adana/Sivas

[Add new category](#)

North Caspian Basin: Tengiz, Korolev, Kashagan, ...

Add Sub-basin/field



[Use MapInterface](#) | [Refresh Page](#)

Ice/Green House

Icehouse

| [Delete](#)

Additional System Info  
[max. 30 words]

[Submit](#)

[Previous](#)

[Next](#)

# Example of Input Data Set

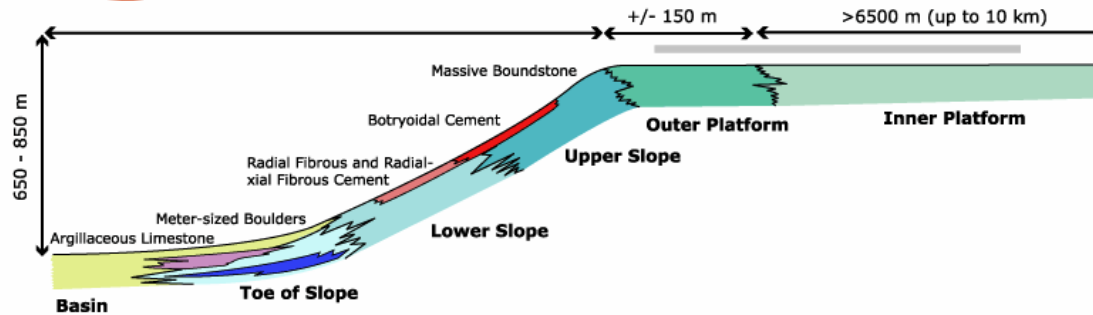


INSERT/EDIT RECORD: SIERRA DE CUERA (#1)

#1 - #2 - #3 - #4 - #5 - #6 - #7 - #8 - #9 - #10 - Cross Section - #11 - #12 - #13 - #14 - #15 - #16

[Example](#) [Preview](#)

## Simplified Geological Cross-Section



Delete Uploaded Cross-section [i](#)

## Description Regions

Add the following (main) region to describe in the table below: [Please select](#)

Region	Sub-Region	Description	Position
Inner Platform	Lithofacies A	5-35 m thick intervals of subtidal open marine, around or below wave base, skeletal packstone to wackestone, locally grainstone, with <i>Donezella</i> and	1
	Lithofacies B	1-6 m thick intervals of restricted shallow subtidal lagoonal peloidal packstone, with low diversity fossil assemblage; fossil assemblage consists of common	
	Lithofacies C	Thin intervals of high energy intertidal to shallow subtidal coarse grained, poorly sorted oncoid packstones to grainstone to moderately to well sorted,	

Color Code #B4DCC [i](#) submit

- Max. 100 words per text box -

Deactivate Sub-regions [select](#) [i](#)

Delete region

# Example Depositional Information



INSERT/EDIT RECORD: SIERRA DE CUERA (#1)

#1 - #2 - #3 - #4 - #5 - #6 - #7 - #8 - #9 - #10 - #11 - #12 - **#13 - Depositional** - #15 - #16

Depositional

Five general lithofacies zones were observed: inner – and outer platform, upper slope, lower slope and toe-of-slope to basin (Kenter et al., 2002; Della Porta et al., 2002). 1) The platform deposits consist of subtidal limestones and contain shoaling-upwards cycles with a transgressive interval of coated grainstones with oncoids, followed by normal marine algal boundstone and bioclastic grainstone to packstone and, near the top, restricted lagoonal peloidal packstone to grainstone with calcispheres. These cycles have a thickness between 2.5 and 15 m and can be traced from the platform break into the platform interior for at least 6 km. The base consists of intraclast and coated grain-rich packstones and grainstones. Increase in water depth enhances the development of massive, carbonate mud-rich accumulations in a fine-grained packstone with in situ *Donezella* and scattered phylloid algae. This lithofacies (up to 20 m thick) shows a flat-lens shape, and is adjacent to locally bioturbated, skeletal packstone with a diverse, open marine fossil assemblage. These low-relief bioherms, besides *Donezella* and phylloid algae, contain bryozoans, ostracodes, encrusting benthic foraminifers, endothyrids, globivalvulinids, paleotextularids, rare fusulinids, brachiopods, echinoderms, polychaete worm tubes, and rare sponge spicules and trilobites. At the top of the lense shaped bodies *Chaetetes* colonies and rare solitary rugose corals are observed. The associated skeletal packstone are enriched in benthic foraminifers and echinoderms. The fossil assemblage also includes brachiopods, bivalves, bryozoans and calcareous algae, and minor phylloid alga plates. The low relief algal bioherms are overlain by shallow

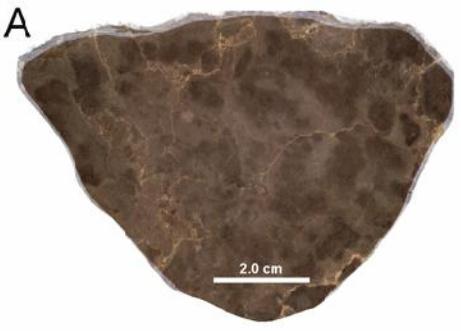
Optional Figure(s)

Figure

[jpg, jpeg, gif and png formats, max. 500kb]

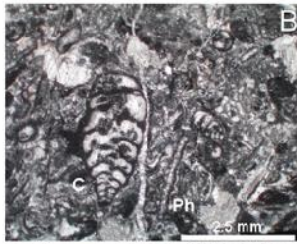
Caption [max. 500 words]

**A**



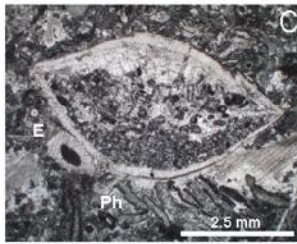
2.0 cm

**B**



Ph C 2.0 mm

**C**



E Ph 2.5 mm

# PFD Reporting



## Web-based Outcrop Digital Analog Database

Home
Info
DATABASE
Options

Basic Search

Advanced Search

Submit Data


Edit Data


Validate Data


Quick Search  
[outcrop id]

Online Members  
J. Kenter

Main Supporters

  
 vrije Universiteit  
amsterdam

  
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 CARDIFF  
UNIVERSITY

### SIERRA DE CUERA

*Jeroen Kenter*

**TIME INTERVAL**

Asselian

CARBONIFEROUS

Pennsylvanian

Gzellan

Kasimovian

Moscovian

Bashkirian

Mississippian

Serpukhovian

Visean

Tournaisian

DEVONIAN

Upper

Famennian

**SPATIAL INFORMATION**

Region Europe

Country Spain

Area Asturias

Coordinates [Lat/Long] 43.35145 / -4.79799

Sedimentary Basin Spanish Trough-Cantabrian Zone

**CARBONATES SYSTEM TYPE**

Platform Type Foreland Margin

Sedimentary Basin Type Foreland

Morphology of Depositional System [Plan View]

[Cross View] Aggradational, Progradation

Additional Sytem Information Seismic scale undisturbed dip section; 5 km horizontal progradation followed by near vertical aggradation; microbial boundstone slope shedding controls depositional flank

**ROCK PROPERTIES**

Lithology [Primary] Limestone

[Secondary] Siliceous Mudstone, Dolomite

Texture Packstone, Microbial Cement Boundstone

Components [Primary] Calcimicrobes and cyanobacteria, Marine green algae, Calcareous benthics, Crinoids, Pellets and Peloids

[Secondary] Bryozoans, Brachiopods, Ooids

Type of Overprint Tectonic - Tilted minor fracturing

**PHYSICAL PROPERTIES**

Rock Mechanics / Petrophysics Density, P-wave velocity, Porosity, S-wave velocity

Geophysics Synthetic Seismic Model

**DIMENSIONS**

Platform [Dip width] 15000 m.

[Thickness] 1300 m.

Slope [Height] min 650 m. max 850 m.

[Angle] min 5° max 32°

[Shape] Planar

**OUTCROP PROPERTIES**

Outcrop Structure Undisturbed

Outcrop Exposure Moderate (>40% exposure and moderately continues)


Stratal Anatomy Superb (visible and continues)

**ADDITIONAL INFORMATION**

Historical Appl. to Subsurface Tengiz, Korolev, Kashagan, Karachaganak (North Caspian Basin)

Green/Ice House Icehouse

Summary of Sequence Stratigraphy



# PFD Report Sierra de Cuera - 1



SIERRA DE CUERA J. Kenter				<b>PHYSICAL PROPERTIES</b> Rock Mechanics Density, P-wave velocity, Porosity, S-wave / Petrophysics velocity Geophysics Synthetic Seismic Model .		<b>DIMENSIONS</b> Platform [Dip width] 15000 m. [Thickness] 1300 m. Slope [Height] min 650 m. max 850 m. [Angle] min 5 ° max 32 ° [Shape] Planar	
<b>TIME INTERVAL</b> Asselian Carboniferous Pennsylvanian Gzellian Kasimovian  Moscovian Bashkirian Mississippian Serpukhovian  Visean Tournaisian Devonian Upper Famennian		<b>SPATIAL INFORMATION</b> Region Europe Country Spain Area Asturias Coordinates [Lat/Long] 43.35145 / -4.79799 Sedimentary Basin Spanish Trough-Cantabrian Zone  <b>CARBONATES SYSTEM TYPE</b> Platform Type Foreland Margin Sedimentary Basin Type Foreland  Morphology of Depositional System [Plan View] [Cross View] Aggradational, Progradation  Additional System Information Seismic scale undisturbed dip section; 5 km horizontal progradation followed by near vertical aggradation; microbial boundstone slope shedding controls depositional flank		<b>OUTCROP PROPERTIES</b> Outcrop Undisturbed Structure Outcrop Good (>60% exposure and moderately Exposure continues) Stratal Superb (visible and continues) Anatomy .		<b>ADDITIONAL INFORMATION</b> Historical Appl. to Tengiz, Korolev, Kashagan, Summary of Subsurface Karachaganak (North Sequence Caspian Basin) Stratigraphy Green/Ice House Icehouse	
<b>ROCK PROPERTIES</b> Lithology [Primary] Limestone Texture Packstone, Microbial Cement [Secondary] Siliceous Mudstone, Dolomite Boundstone . Components [Primary] Calcimicrobes and Type of cyanobacteria, Marine green Tectonic - Tilted minor algae, Calcareous benthics, fracturing Crinoids, Pellets and Peloids [Secondary] Bryozoans, Brachiopods, Ooids .							

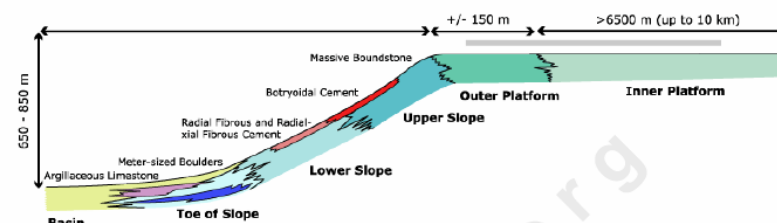
1/28

2/28

# PFD Report Sierra de Cuera - 2



**GEOLOGICAL CROSS SECTION WITH DESCRIPTION OF THE MAJOR REGIONS**



Region / Sub-Region	Description
---------------------	-------------

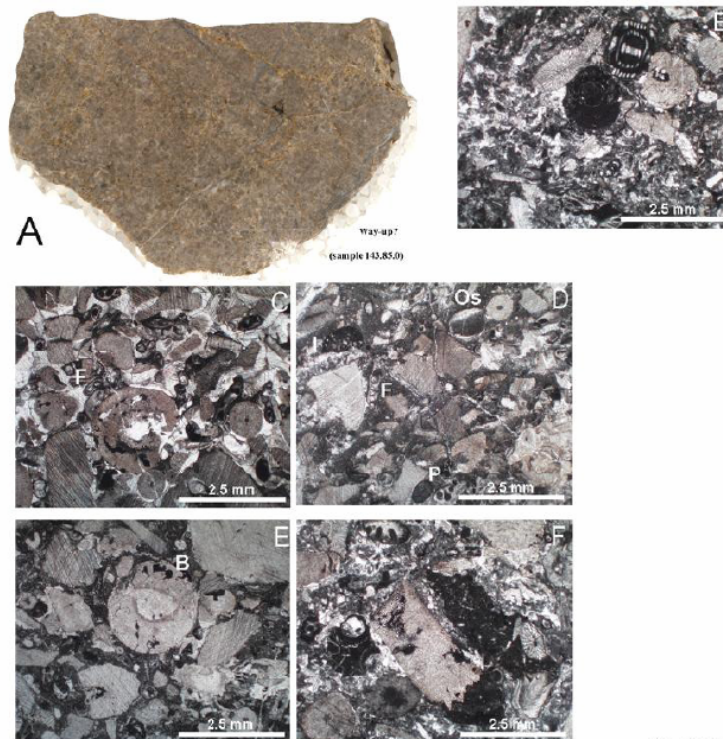
Inner Platform	Lithofacies A	5-35 m thick intervals of subtidal open marine, around or below wave base, skeletal packstone to wackestone, locally grainstone, with <i>Donezella</i> and phylloid algae along with diverse skeletal grains and probably formed mounds in A1. The skeletal assemblage consists of: foraminifers (fusulinids, <i>Endothyra</i> , <i>Globivalvulina</i> , tubular calcitornellids, <i>Climacammina</i> , <i>Bradyina</i> , <i>Tuberitina</i> , <i>Tetrataxis</i> ), calcareous algae (few phylloid algae, <i>Komia</i> and <i>Ungdarella</i> , very rare <i>Beresellid</i> algae and <i>Donezella</i> fragments), echinoderms, and rare bryozoan fragments, ostracodes, brachiopods, and bivalves. Few peloids and rare oncoids and intraclasts are observed. Lithofacies A represents the m-scale alternation of flat lens-shaped algal-skeletal banks (A2) and bioclastic debris sediments (A1) deposited in an open marine, subtidal environment.
	Lithofacies B	1-6 m thick intervals of restricted shallow subtidal lagoonal peloidal packstone, with low diversity fossil assemblage; fossil assemblage consists of common to few calcareous algae ( <i>Beresella</i> , <i>Dvinella</i> , <i>Uraloporella</i> , <i>Petschoria</i> , <i>Ungdarella</i> , <i>Komia</i> , phylloid algae), few foraminifers (fusulinids, <i>Endothyrids</i> , <i>Climacammina</i> , <i>Bradyina</i> , <i>Tetrataxis</i> , <i>Tuberitina</i> , <i>Globivalvulina</i> ), calcispheres, ostracodes, brachiopods, echinoderms. In situ <i>Chaetetes</i> colonies and fragments. Few to common peloids; coarser intervals with rare oncoids, intraclasts, fusulinids and echinoderms. Burrows (mm's to cm's size). Locally <i>Microcodium</i> and common peloids. The texture and paleoecology of the fossil assemblage contained in lithofacies B are indicative of a shallow lagoon, with deposition in normal marine (B1) to restricted conditions (B2).
	Lithofacies C	Thin intervals of high energy intertidal to shallow subtidal coarse grained, poorly sorted oncoid packstones to grainstone to moderately well sorted, mixed coated grain-skeletal-intraclast-oid grainstone. C1 is represented by bedded intervals, frequently thin, rich in oncoids and associated with lithofacies B; C2 is ooid coated pisoid grain grainstone and coated grain-skeletal-peloid grainstone/packstone associated with lithofacies D. These intervals are generally not compacted and have abundant cement. Near the platform break, the C2 interval does not contain oncoids and it is a well-washed ooidal grainstone with isopachous rims of fibrous cement. In the outer platform are grainstone intervals, nearly 5 m to 2 m thick, which should be considered separately. Components are benthic foraminifers ( <i>Bradyina</i> , fusulinids, tubular calcitornellids, <i>Climacammina</i> , <i>Endothyrids</i> , <i>Staffellids</i> ), few calcareous algae ( <i>Epimastopora</i> , <i>Komia</i> , <i>Beresella</i> , phylloid algae), few to common crinoids and echinoid spines, rare brachiopods, fenestellids, gastropods, and fragments of <i>Chaetetes</i> . Rare observed presence of <i>Microcodium</i> but common to few <i>Osagia</i> oncoids, coated grains, ooids, aggregates, peloids, and intraclasts. Evidence found for current and wave traction; cross-bedding (?) and subaerial exposure.



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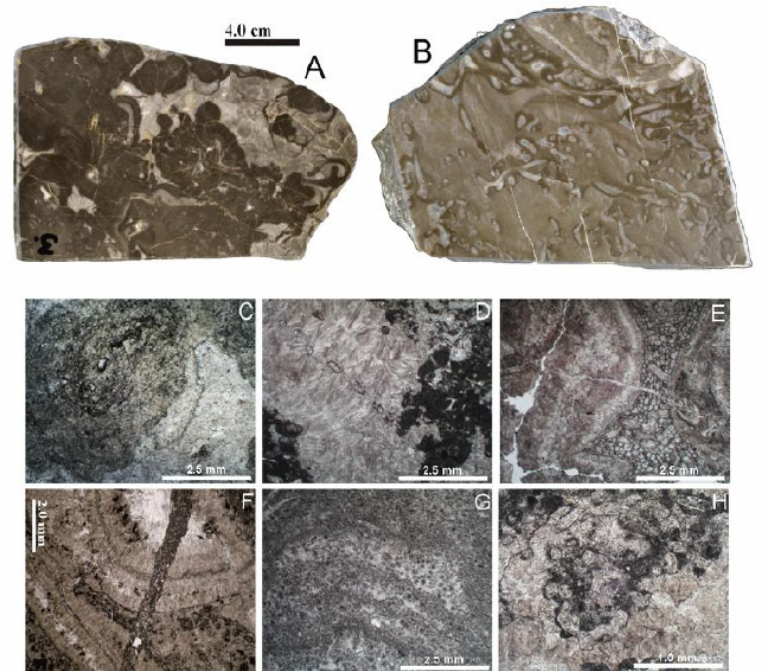


Caption: Figure 6 cont'd (K) Coated grain-oncoid packstone of lithofacies C1 showing an intraclast with micritic coating, fusulinid fragments, echinoderms, and phylloid algae (Ph). (L) Fragments of probable *Microcodium* in lithofacies C1. (M) *Komia* (K) and fenestellid bryozoans (F) in clotted peloidal micrite. (N) Boundstone type of lithofacies D with the alga defined as *Iberiaella* (Ib) by Rácz (1984) associated with dark homogenous and clotted micrite; the algal branches create shelter cavities filled by radial fibrous cement. (O) The alga *Iberiaella* exhibiting encrusting habit associated with automicrite and tubular calcitornellid foraminifers. (P) Sub-spherical and elongated biomolds in lithofacies D, which could represent either phylloid algae or sponges. (Q) Lithofacies D microfacies type rich in homogenous carbonate mud and fenestellid bryozoans. (R) Lithofacies D with bryozoans and abundant cement filling primary cavities. (S) Lithofacies D boundstone with clotted peloidal micrite containing fractures filled by dark yellow/brown cement of probable meteoric origin (?) (T) Photomicrographs showing ooids, coated grains and intraclasts filling pockets and fissures within lithofacies D boundstone; grains were likely reworked and transported by currents and waves. (U) Slab photo showing the top of lithofacies D unit in section 0 at 29.8 m is characterized by a brecciated and altered horizon suggested to be the result of subaerial exposure.



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Caption: Figure 7. Lithofacies Type E - Platform Flooding and Outermost Platform (A) Slab photo showing typical lithofacies E. (B) Lithofacies E-A1 skeletal packstone containing crinoid ossicles, peloids, staffellids, *Bradyina*, *ungdarellid* algae and bryozoan fragments. (C) Crinoid dominated grainstone to rudstone with syntaxial overgrowth calcite cement and associated fenestellid bryozoa. (D) Packstone containing echinoderms, fenestellid bryozoan fragments (F), intraclasts (I) pellets (P) and an ostracod shell (O). Lithofacies Type E - Platform Flooding and Outermost Platform (E) Crinoid-dominated pack- to rudstone showing crinoid ossicles with borings and sediment fills. (F) Skeletal packstone with crinoid ossicles, *Komia*, brachiopod fragments and intraclasts.



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# Funding and Support



- ✓ Funding has been committed by VUA group, revenues Chevron (2 years) and negotiations are continuing with other industry partners
- ✓ Technical support is provided by Chevron
- ✓ AAPG is very positive and willing to publish the Carbonate Volume

# Conclusions



**WODAD will provide a searchable and interactive database facilitating**

- ✓ **Conceptualization of stratigraphic, facies and diagenetic relationships**
- ✓ **Providing quantitative information that can be compared across timescales and worldwide**
- ✓ **15 data sets are currently edited as test phase**
- ✓ **Search functionality is currently added**
- ✓ **An Open Call will be advertised and individual authors will be contacted**
- ✓ **Spatial (GIS) data sets will be added soon**