

- New Summary

- Powerpoint

Chadly

Jan - Powerpoint occurrence, Black Sea, Turkey

Chadly

Evans

9000 m PITS BASIN → arc BASIN →

Residual thickness

Upper T<sub>2</sub> - Mesozoic

extension & compression zones

- Unroofed Mesozoic Potomac

- Best wells; unroofed Potomac

Best wells find - most - determine

Conventional Reservoir

Seismic Lines unconformity / Basin Height

Rock Eval - TOC DATA

Source Rock - Isotherm

- Known type; vitrinite reflectance

- Dynamic maturity

Basin Modeling

I.D. Source

Rock

& Seals

~~Diagenetic Effects Affecting~~

Basin Analysis

~~Seals in relation into Structure~~

✓ HANNOVT

✓ ppt

DYLAN

PARENT IONERS ~~in~~ / Hydrocarbon Storage  
Pylon

Basins with IONERS + INTRUSIONS

STERILIZED / LENTIL POT

MAGMATISM - FERTILIZER SYSTEM

SILE INTRUSIONS

FRACURE RESONANCE

SILE BASINS + CONDIT 3-D Seismic, SILE MAPPING  
- full hydroc  
magnet

FRAC - FRACURE PERMEABILITY

- fracture fem. Seismic + well DATA

Core  
DATA

- 30/20  
MAGNETIC FRACTURE - STERILIZED BASIN NW

PALAEOTIC - Mesozoic Basin

NW Atlantic RIFT margins + FRACTURE BASIN

ALTERNATE / SPREADER - SILE INTRUSIONS DRAINAGE

- PAVED GIVE IONERS ACIMU FRACTURE  
- INTRUSIONS INTO STAGES BASINS

MAGNETIC PATENT  
200 IONERS SILE - FRACURE PERMEABILITY  
Permeability Core Reservoir Core Fracture  
CONDIT

Handwritten notes: HAWAII, PAPERPOINT, RYAN

TOIN to A, ATABASCA

TRAP SANDS

✓ BIRMAN  
PPT-DATA  
KIMBERLITE

CROSS-CUTTING  
RELATIONS

AIEK - P. ACCIDENTS

FLEXURE LAMINA / LAMINAE

SI  
KIMBERLITE  
P. PPT  
DIAMONDS

oil charge areas  
MESA MAPS

4-way ANTICLINE

LATEK - PRECIPITATION

ONLAP TO

CAUSASIM SINK

BITUMEN

TRAPPING

SEVERELY KNOWN

CHANGED AREA

78 MA

BREACHES  
ANTICLINALS  
UPRIFT & GRAVE

TRAP & RESERVOIRS

HEAVY OIL - BIRMAN RESERVOIR

1 trillion bbl reserves

UPRIFT  
GRAVE

ATABASCA OR SANDS

MIMIC CAUSASIM SINK

LOADING / FLEXURE

PZ  
CARBONATE  
M.Z. SUCCESSIONS

ASIN - AREA

SINKS WITH WILSON ISLAND

SEAFLOOR  
SURFACE  
PASSIVE

ROCK WITH GOOD BERT.

TO SOUTH

NUMBER - ALL FOLD & MUST FORM

→

TRAP TREN

- Pz Some rocks

- Post K migration & NAPPLIC

migration 100's Km west to east

Basin - EDCS (Darien Basin)

Low MATURAN

Heavy oil —

SPURCANE Corwin + BOPACH

ANIZCANE - most ANIZCANE maps

Closure AT 500M

6 TRAP DOMAINS

Cody

Party  
Organization

Party  
Prepared

MacGowan

NILE BASIN

"NILE" alluvium to present SYSTEM

AFRICAN TECTONIC -

ARMED Fossil TRACK

RIFTING

ZONE

Source - Nile Basin

"Nile Basin Source"

NILE DELTA; Catchment Analysis

Geo. PLATE

PALEOZOIC RECONSTRUCTION

- Climate

- Geo. Response to Sea Level

Delta Development.

- CLASIC Supply

vs. CLIMATE

"Nile Basin Source"

✓ Handout

✓ PPT Tim



petrophysical Analysis

of shale gas Reservoirs

Challenging reservoirs  
improve reservoir characterization

Non-Conventional

Methods Approach - Characterization

of shale gas reservoir

Requirement in Characterization of

Non-Conventional Reservoir

"Shale" reservoirs  
- heterogeneous  
- Anisotropic

① Shale gas reservoirs ~~characterization~~

- Fracture Analysis ② Heterogeneity Complex Lithologic

Heterogeneity

③ Need for of Methods / Approach

TO EVALUATING

DATA REQUIREMENTS

REQUIREMENTS  
TECHNIQUES

Kerogen  
CONTENT  
in  
shale

LITH, porosity, TOC, perm.,  
pore volume

Gas Volumes

- free gas

- ~~Adsorbed~~ gas

"Shale" = An inclusive

OF VARYING "TOC"

Key words vs.

NON-CON

Core CALIBRATION TO LOG ANALYSIS

L Electric logs

"Archie" methods - conductivity, porosity, permeability

JONATHAN

JURASSIC SALT

LOVANN SALT  
GULF OF MEXICO

DAVIS -  
GULF OF MEXICO

PLATE TECTONIC JURASSIC

- SALT BASINS DURING PLATE TECTONIC

- PLATE TECTONIC

SOURCE OF SALT DURING PLATE TECTONIC

GULF DEEP-WATER STRUCTURE

SALT CRYSTALLIZATION

VS.

DIPPING LOCATIONS

DEEP WATER STRUCTURE  
LOVANN SALT IMPROPER READ

MOVEMENT SALT STRIPES

SUBSIDENCE STRUCTURE IN DEEP GULF

SALT PROVINCE (1) GULF COAST FLEXURE / ITALY LINE  
PASSIVE LOCATION - DIPPING

PLATE TECTONIC

DESCRIPTION

DIVERGENT MOUNTAIN OF SOUTHERN

LOVANN

BRAZOS TERN FURT

SEISMIC REFLECTION

SEISMIC CROSS-SECTIONS

SALT BASINS

- DIPPING

- FOLD BELT

PRO-GRANT - SALT DIPPING

SALT PILLARS

THINNING

\* Gas Phase

"TIGHT GAS" } Anisotropic  
Bayliff & Patton } Gas  
CRF Study

LAW - Fracture Reservoir Distance Basin,  
Colorado

PILLAGE BASIN, CO

FAULT - Fracture Study - Metamorphic Group

TIGHT GAS SF - Fracture Permeability

All  
tools

UPPER K - Fracture - Shallow marine facies  
Seismic Analysis

INVEST - Normal Fault

Fault Spacing

ORIENTATION + Density (or porosity) Analysis

"Fracture Intensity"

"Bone Hole Breakouts" maximum 6,  
N-NW  
orientation

3-D Seismic

Well log, wireline log

Fractured GAT SF Recovery vs. Production

Bone Holes  
Gas well

Fracture formation of,  
pore pressure change  
Hydrothermal generation

CLASTIC  
PACIFIC



Bonvinon AS Az  
E-Press ad - Thermal MATAMORA - BRAZIL

CAMPES BASIN Brazil - "MATAMORA SA  
BASIN"

RESERVANCE - BURIA HISTORY - THERMAL  
MATAMORA PAPER

Thermal RESERVANCE  
MATAMORA MODELS - - EVALUATING  
petro

SALT BASE - rift cells POSSIBLE  
PETRO PAPER  
SOUTH ATLANTIC RIFTING

SALT DEPOSITION  
SINCE 1950 TO 1960  
MEASUREMENTS  
DIAPYR  
EATING K  
PUTTING

NEWS  
- BIOGEOCHEMISTRY  
"HETEROGENEOUS  
PARTICULATE"  
DECIDING MODELS  
BURIA - THERMAL HISTORY

Source  
LACUSMINE  
MARINE  
Shales

HEAT flow of MATAMORA  
HEAT flow MODELS of MATAMORA  
ESTIMATES

DRILL DATA - KEROGEN ANALYSIS

MATAMORA  
ESTIMATES

LITH  
DATA

TOC 2-5%  
S<sub>2</sub> %  
VITRINITES  
RESERVANCE

PRESPECT

Upper Jurassic - Norway Sea  
West of Norway

Reefers Hecate is a - Seismicity

"Super Giant" New field  
From oil & gas field

SS - shale matrix

Deeper - shallow marine

Depos. normal fault - Recession - manifest

"Coastal" SS Geomorphology

Viking Graben  $1.4 \times 10^9$  BBL oil production

Left Basin production  $392 \times 10^9$  TCF gas

Recession - shallow marine SS

SIGAT model - facies analysis

PARAGENETIC model

SS TANGLES - PRODUCT TRAPS

Buried TILES Half GRABENS

REGRESSIVE  
PRODUCTION

RECESSION - TRANSgression BEHAVIOR

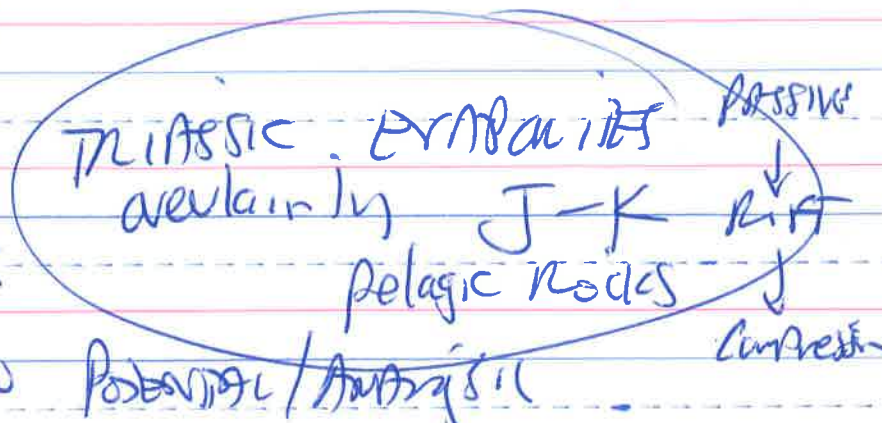
- New well  
- Seismic analysis  
3-D seismic  
Well log

WIRELINE LOGS  
CORE LOGS  
BIOMATRIALogy  
CORROSION

SEQUENCE  
SIGAT  
FACIES  
CHARACTERIZATION

KARAKTERISTIK  
IONIAN SEA Petroleum System

Triassic  
Exploitation  
Maturitas  
Greece



IONIAN SEA  
ANTICLINAL  
HYDROCARBON

POTENTIAL / ANALYSIS

Horizontal  
Flow of Hydrocarbons

"Fryet" - Deep  
"MORASSE" - Shallow

Basin; Seismic DATA

LS - SS - Shales  
+ Siltstone

- Basin Analysis  
- Facies Analysis  
- Stratigraphy

Flow - BEST  
MAP  
POTENTIAL

- Petroleum System Evaluation

- Numerical Petrochemical / MATURITAS

Kernel Analysis  
"TOC"

Kernel Types  
+ FACIES ANALYSIS

Reservoir - TRAP EVALUATION  
SEISMIC PROFILE  
UNCONVENTIONAL Reservoirs  
EVALUATION / POTENTIAL / ANALYSIS  
Shale / OIL  
Shale / GAS

KARO Moscaroli

Seismic Analysis

Hydrogen Field

Norway

Norway - Lower K

Delivering production Hydrogen field

ONE OF FIRST Giant oil fields discovered in N. Sea

Production DECLINE for Deep 30 years Jurassic Reservoirs

Deep reservoir = logistically difficult

Erroneous Reservoirs - Shallow, new explanation

- Seismic Surveys
- well logs

"HARKNESS" Salt Sea, Refine FAULT TRAPS

Structural Controls; Gamma Ray

Angular unconformities

Structural Analysis

New Correlation

Stratigraphic Units

PALEOGEOMORPHY

- ISOPACH MAPS

- STRUCTURAL CORRELATION MAPS

Cretaceous play EVALUATION

FACIES / Basin Models Reservoir Connectivity

- TRAP EVALUATION v FAULT CONNECTIVITY

RISK ANALYSIS - Reservoir Connectivity

LEF

Koht et al

MARCONI STATE

ACQUINO

PENNSYLVANIA / APP BASIN

UNION SPRING MEMBER

middle offshore  
STATISTICAL  
Complex

Factors of  
prograding Delta Complex

MARCONI  
FR

MARCONI  
Shale-gas  
hydro face

Resource Data Analysis  
Regression HIGH STAIN

Wax Loss, Core  
ANALYSIS

Facing Stain  
MAGIT

NICE  
Gamma Ray  
MAPS

EAST → WEST PROGRADATION

PALEOGEOMORPHIC ANALYSIS

ORAUAGA LOTS  
LS

SINAIAN MAPS

Gamma Ray

Wax Loss

Core

Core Sample  
Geochemistry  
C/O C  
Elements

FACTORS ANALYSIS  
TRANSITION - RESERVOIR  
FLUCTUATION

ISOPACH +  
STRUCTURE  
CONDENSED

Basin Analysis

MAPS