

SENEGAL BASINS

POTENTIAL & ACREAGE



LOCATION



AREA : 196 192 KM2

POPULATION : ~12 000 000 hbts

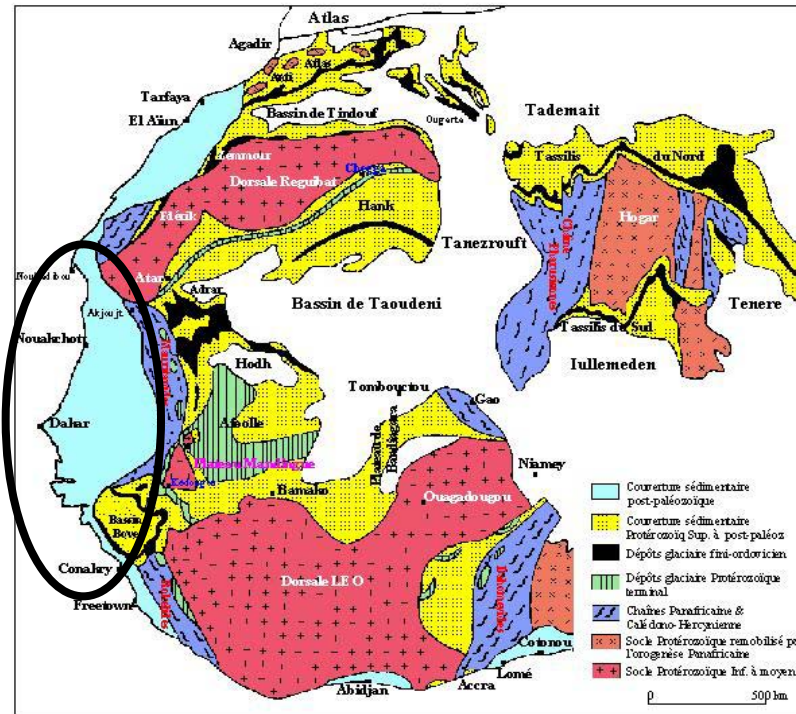
DENSITY: 51 h / Km2

GNP : 1110 \$

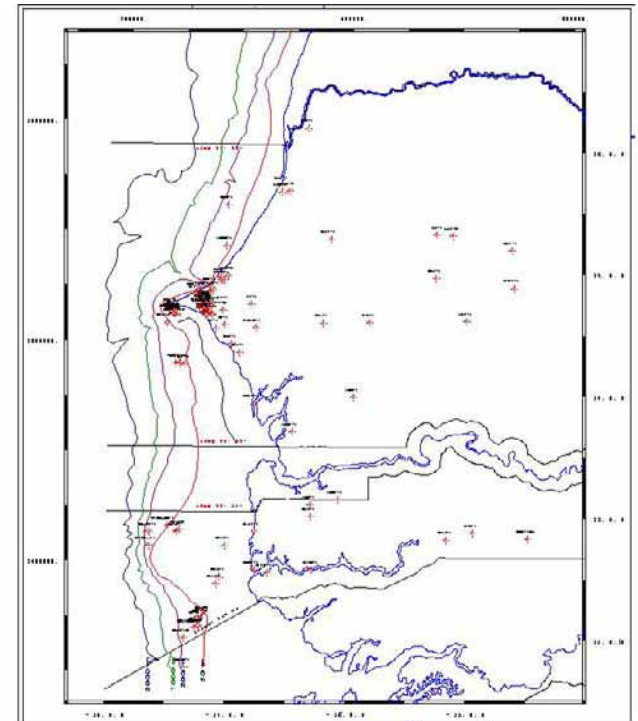
Dakar



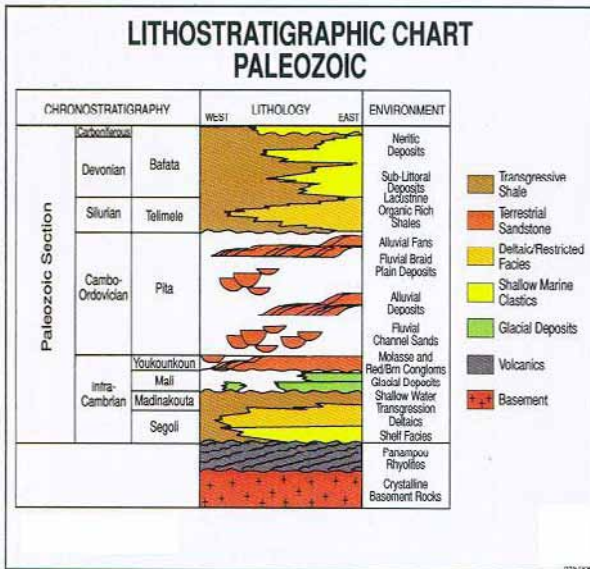
NW African coastal basin the MSGBC



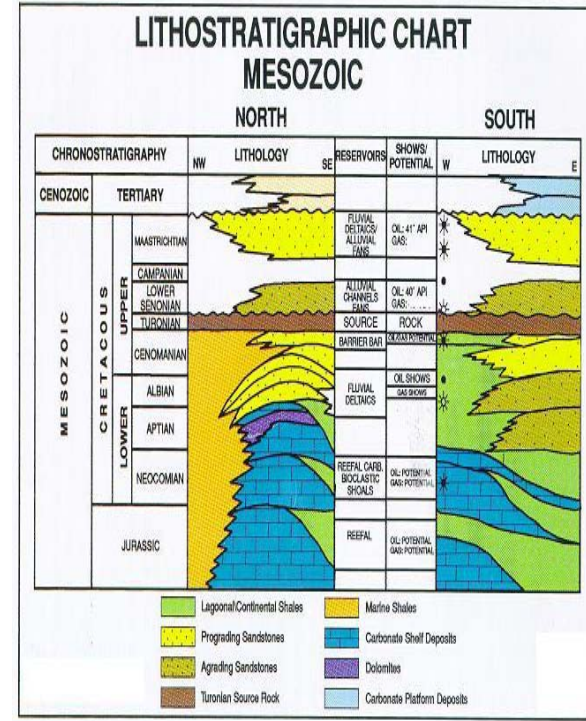
Mesozoic-Cenozoic passive margin basin overlying a Paleozoic basin



no wells in deep water

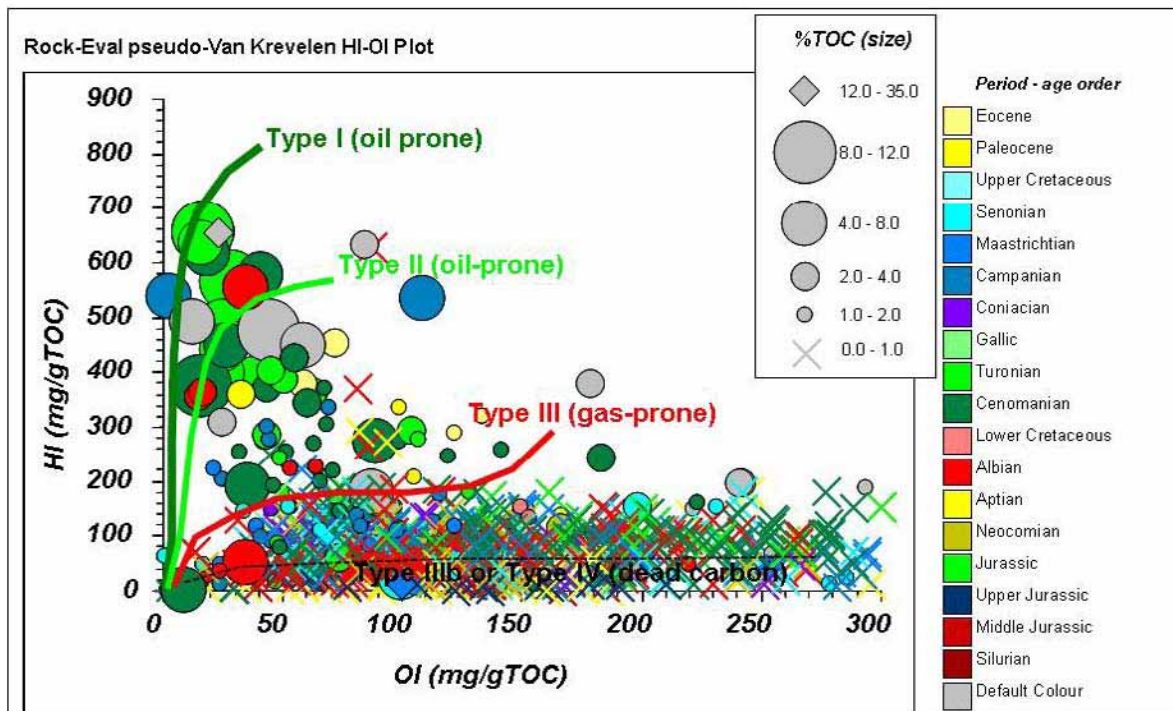


- **Ordovician sandstones** : no primary porosity, but intensely fractured, good secondary reservoirs having excellent deliverability
- **Devonian sandstones** : fine to coarse grained, often oolitic with porosities ~ 15% - 20%.
- **Upper Devonian shales**



- Upper Tertiary shaly sequences
- Lower Tertiary clastics and carbonates
- Upper Cretaceous sands and shale sequences
- Jurassic - lower Cretaceous carbonate section

Best source rocks Cenomanian-Turonian and Albian



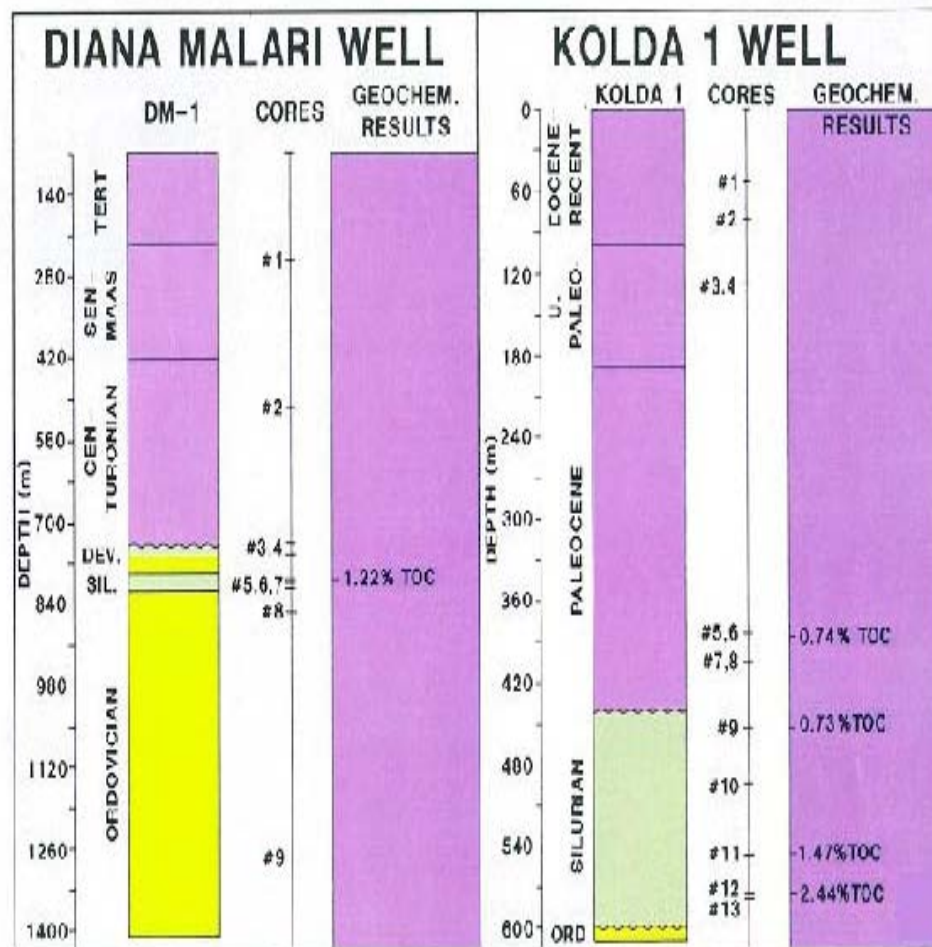
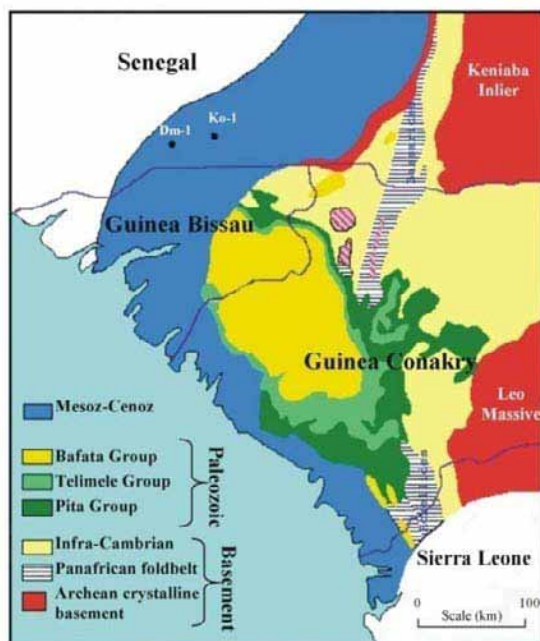
- in CM-7
Cenomanian level at 2608m with
TOC = 8.72 %
HI = 660 mg/g
- in CM-10
Turonian level at 2554 m with
TOC = 5.25 %
HI = 638 mg/g

Silurian shales :

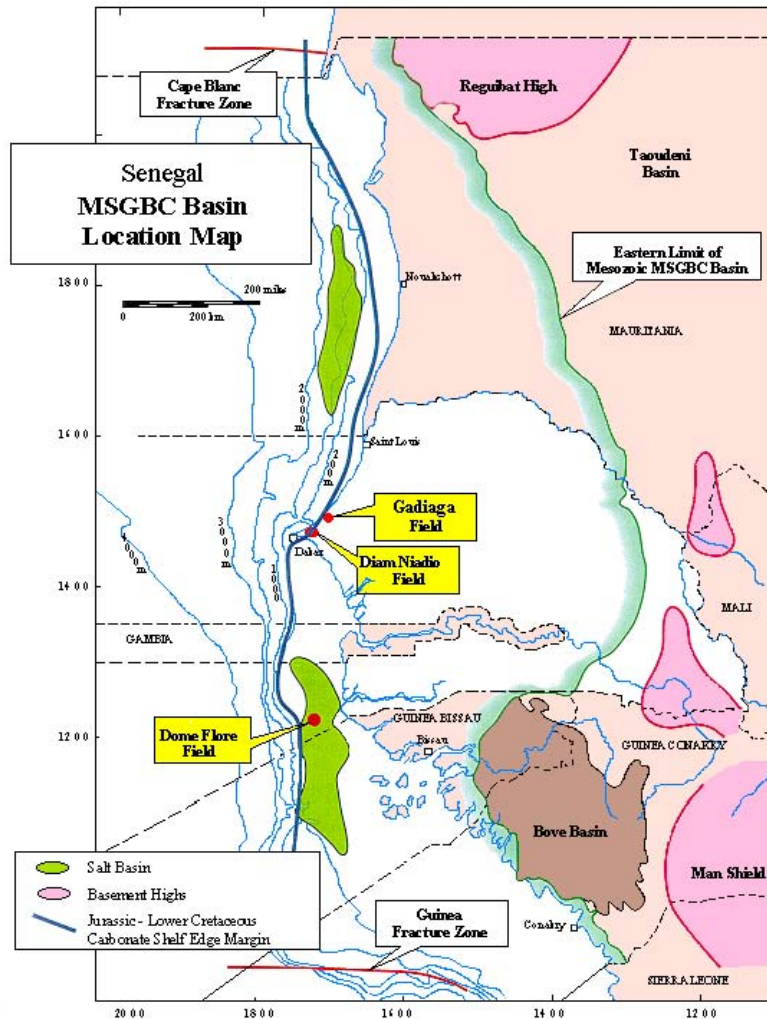
best regional source rocks

TOC ~ 1% - 3%

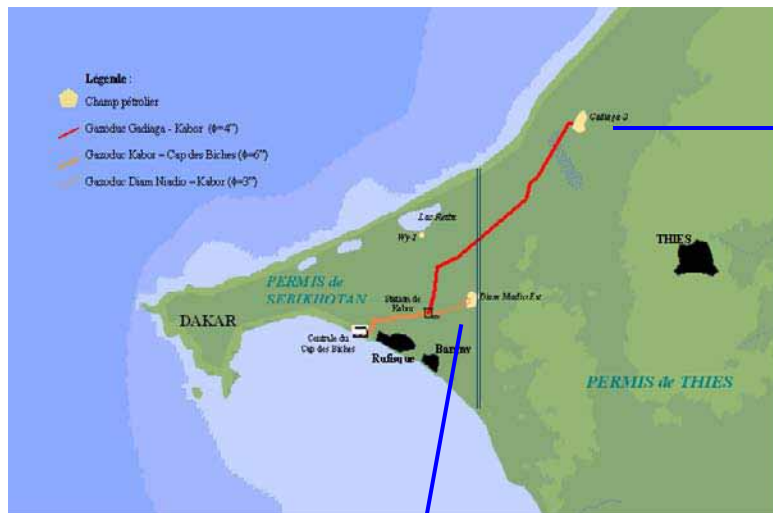
Ro ~ 0.95 - 1.3



HYDROCARBON OCCURRENCES & PRODUCTION



- Diam Niadio field
- Gadiaga field
- Dome Flore & Gea fields



Gadiaga field

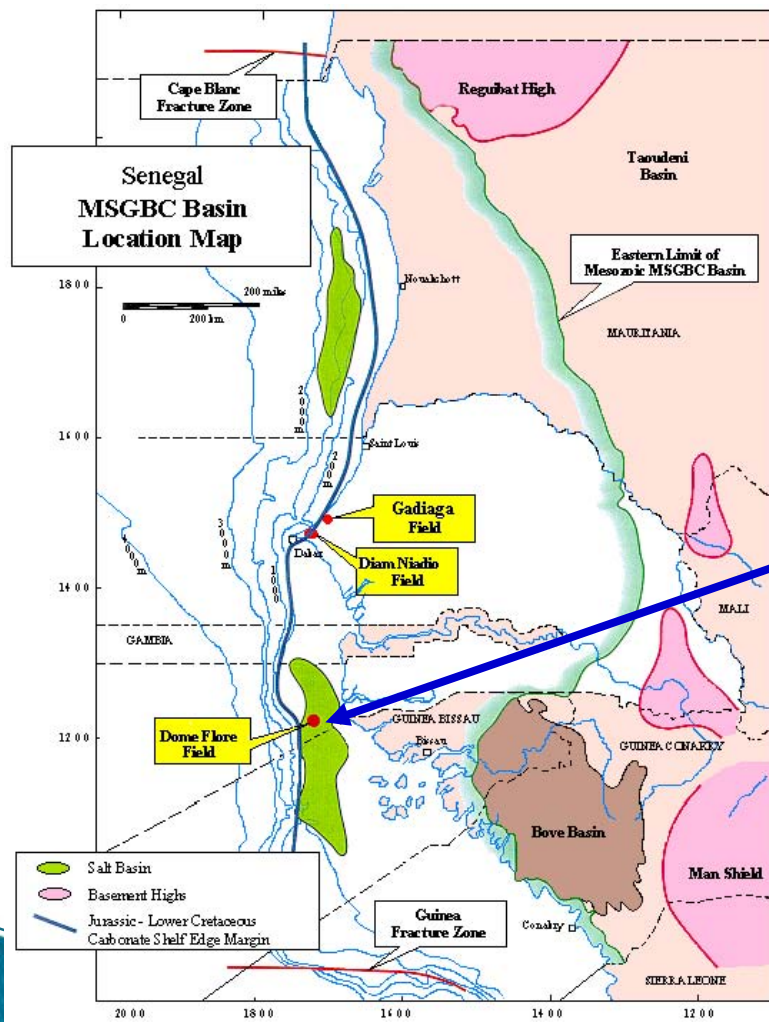
- ~ 90 000 000 Nm³ (3.15 BCF)
producing since Oct 2002

Diamniadio field

- 217 393 033 Nm³ (7.6 Bcf)
from 1987 to 2000

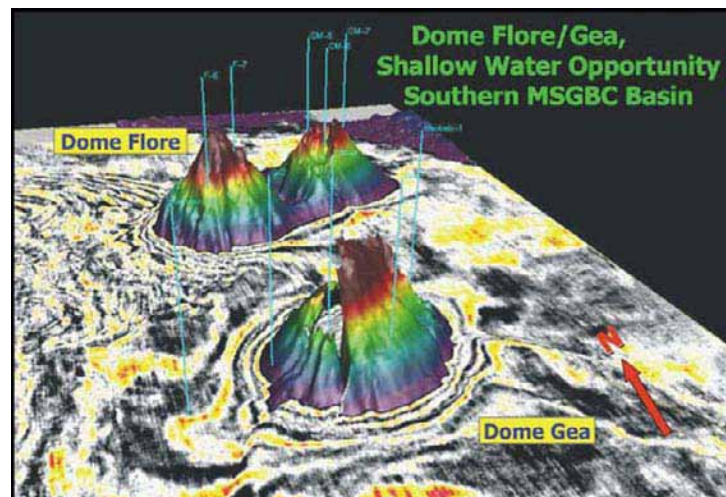
- 62 642 bbs light oil 34 API
- 35 692 bbs condensate

ANNEE	PRODUCTION DE GAZ (Nm ³)	CUMUL (Nm ³)
Octobre 2002	3 379 431	3 379 431
2003	12 637 561	16 016 992
2004	15 101 900	31 118 892
2005	15 936 769	47 055 661
2006	12 225 816	59 281 477
2007	10 865 236	70 146 713
2008	6 796 073	76 942 786
To Oct 2009	13 241 389	90 184 175

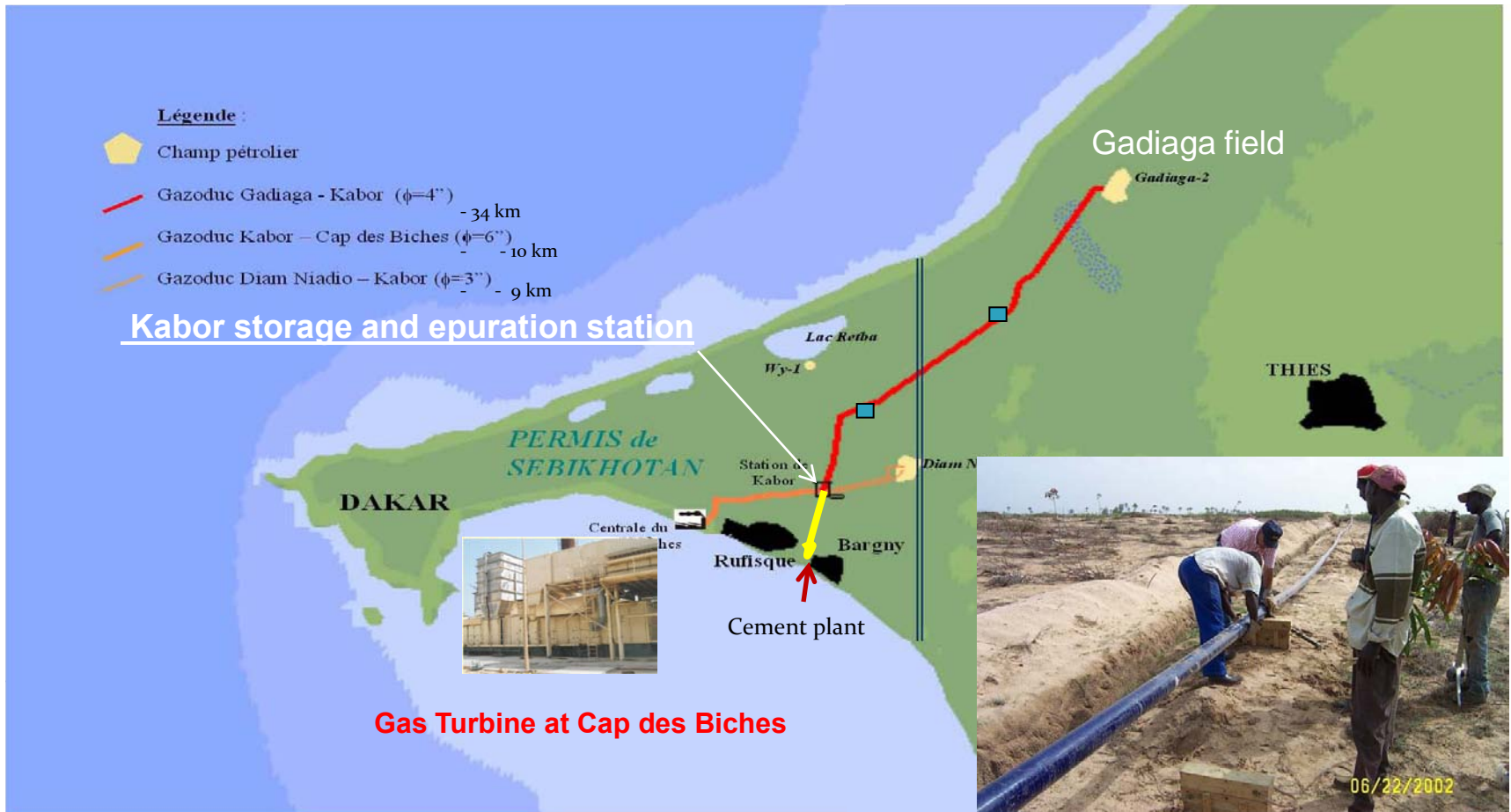


Heavy Oil in Oligocene limestones
(10 – 13 API ~ 1Bbls)
Light Oil Maestrichtian
(33 API)
Oil shows in Miocene & Albian sands

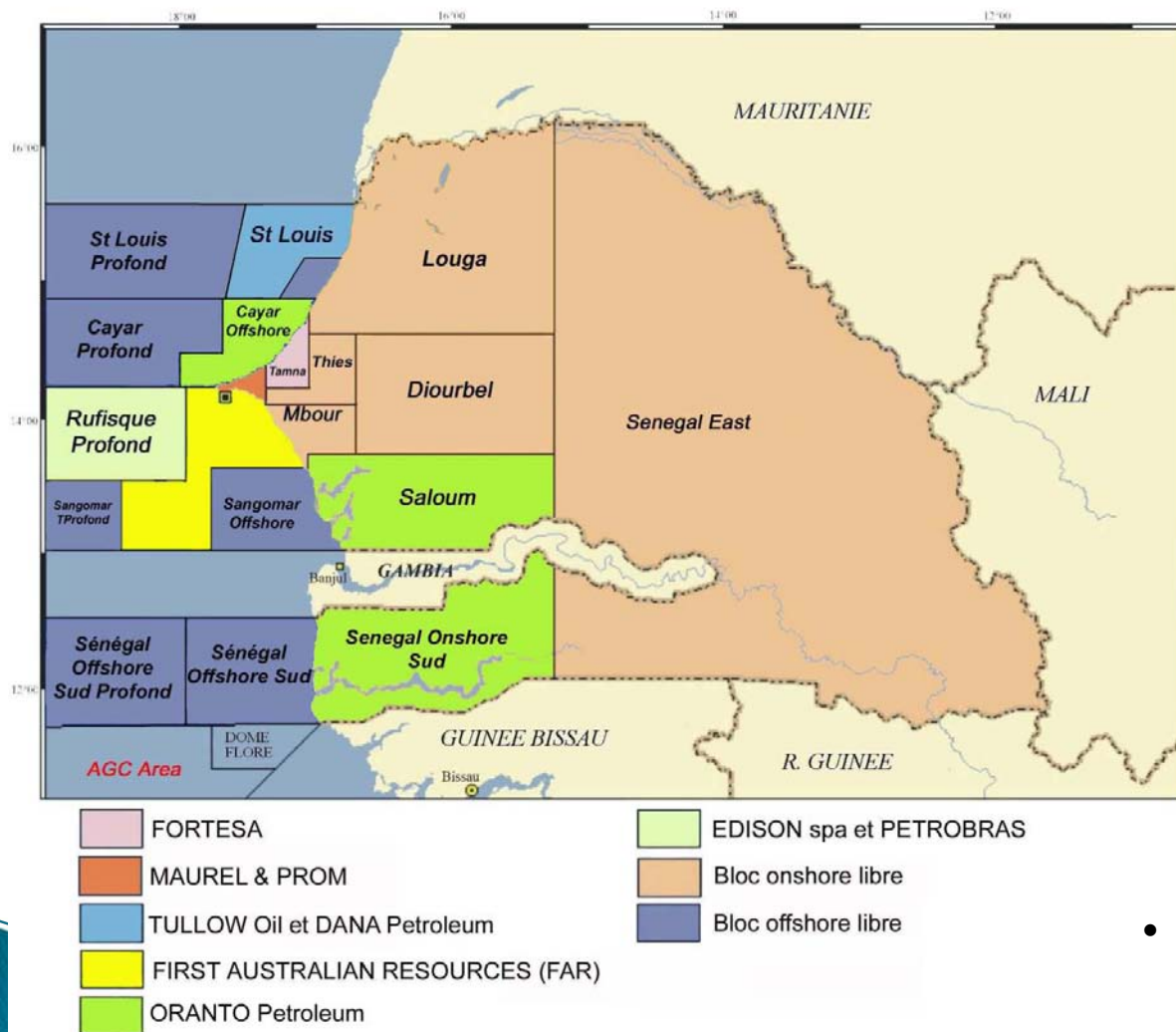
Flore & Gea fields



GAS TRANSPORT NETWORK



CONTRACT AREAS



- 4 PSCs offshore

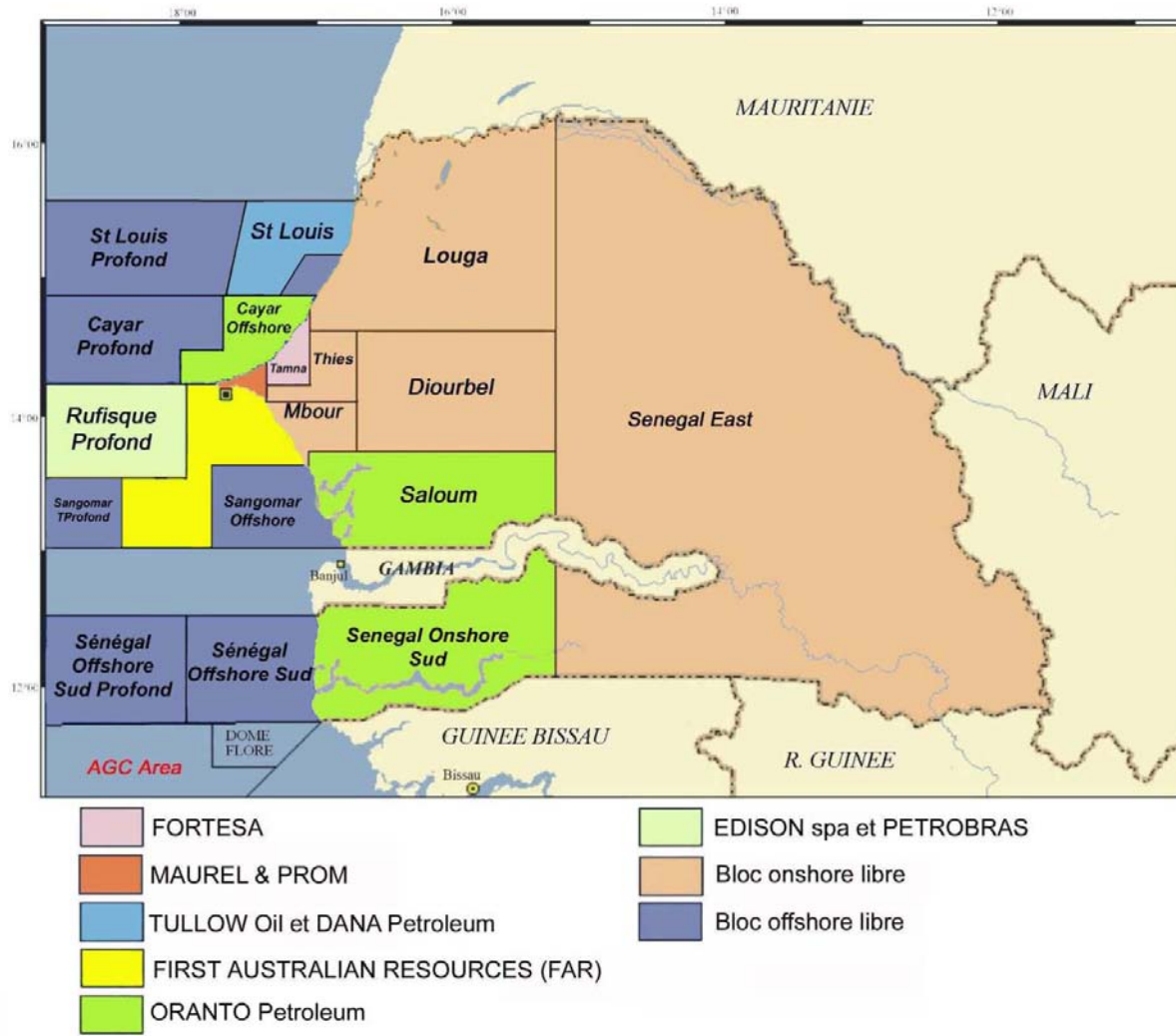
- 4 PSCs onshore

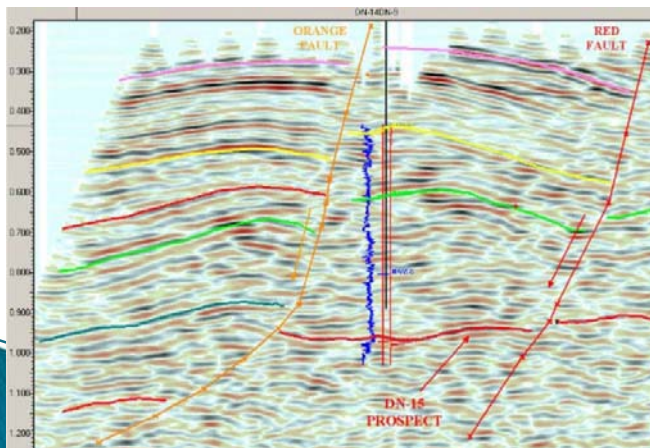
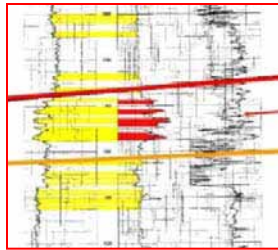
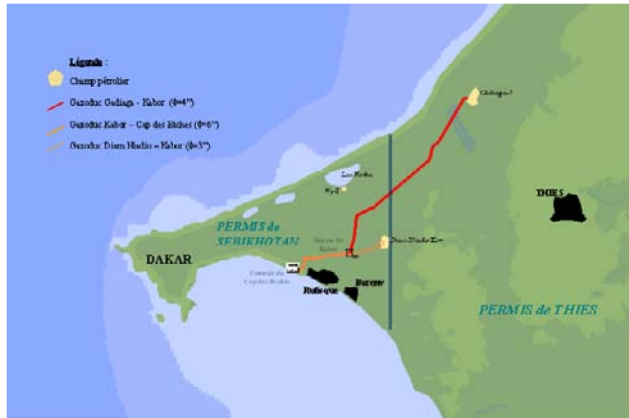
presently available

- 6 blocks offshore

- 4 blocks onshore

REVIEW OF RECENT EXPLORATION ACTIVITIES





Avril 2003

DN-15B in 2006

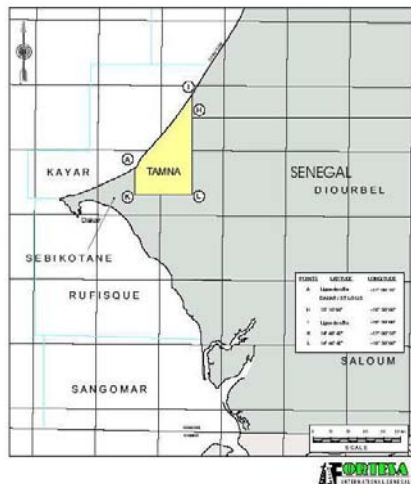


commitment : 2 exploration wells

Konkorong-1

Baobab-1

TAMNA PERMIT AREA



6 wells drilled the last two years

Gas in Lower Senonian sands

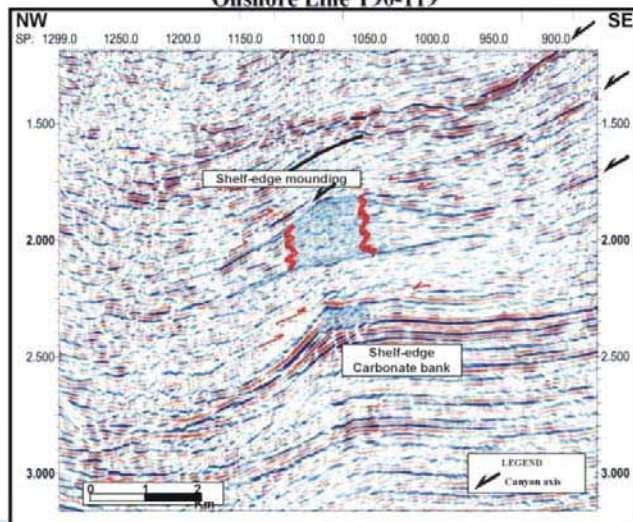
connected to transport system

~64 000 Nm³ to Sococim cement plant presently

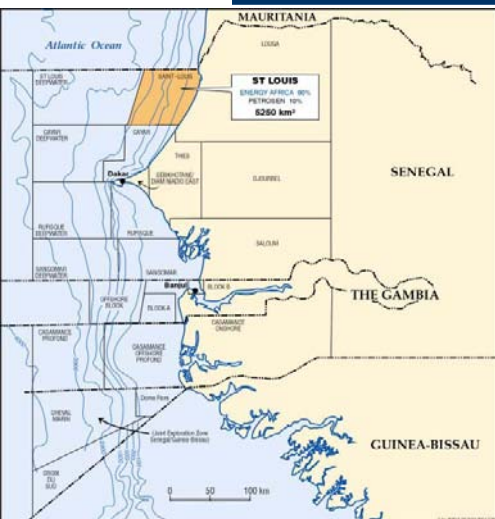
~ 300 000 Nm³ / day possible delivery to Senelec power plant

October 2006

Carbonate Bank Build-up With Reefal Mounding
Onshore Line T90-119



SAINT LOUIS offshore



granted 2003

- Structural/Stratigraphic traps west of the Cayar fault zone;
- Structural traps within the Cayar fault zone;
- Turbidites/mas flow deposits west of the Cayar fault zone



60 %



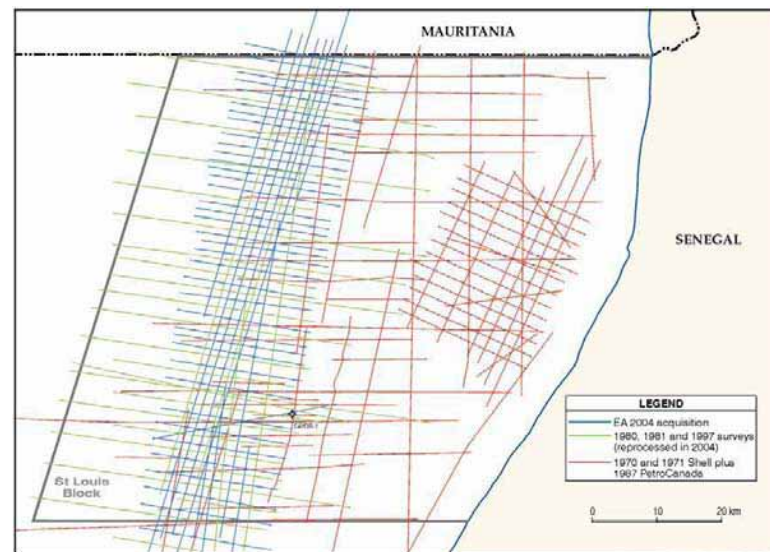
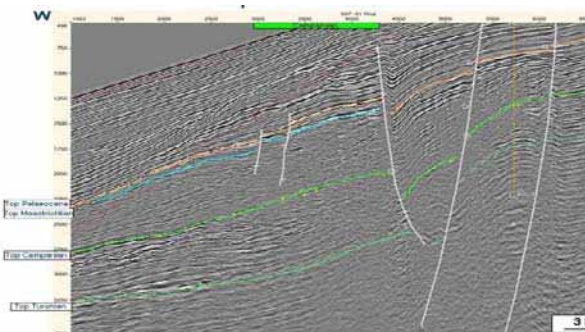
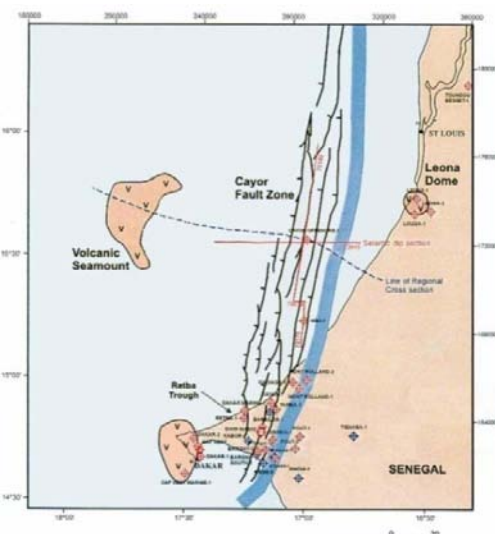
Dana Petroleum plc

30 %



10 %

1200 km 2D *Juillet 2004*



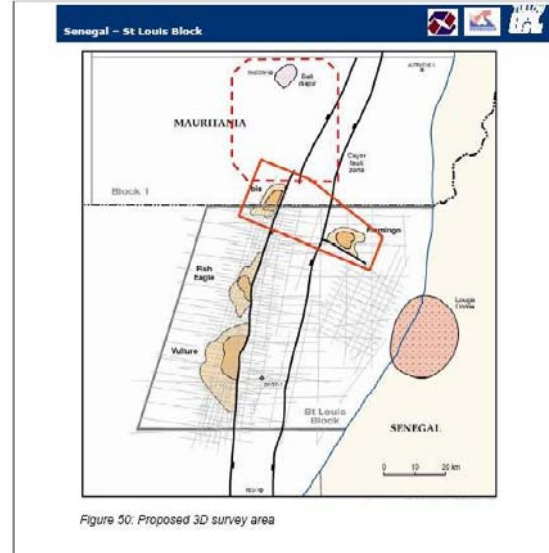
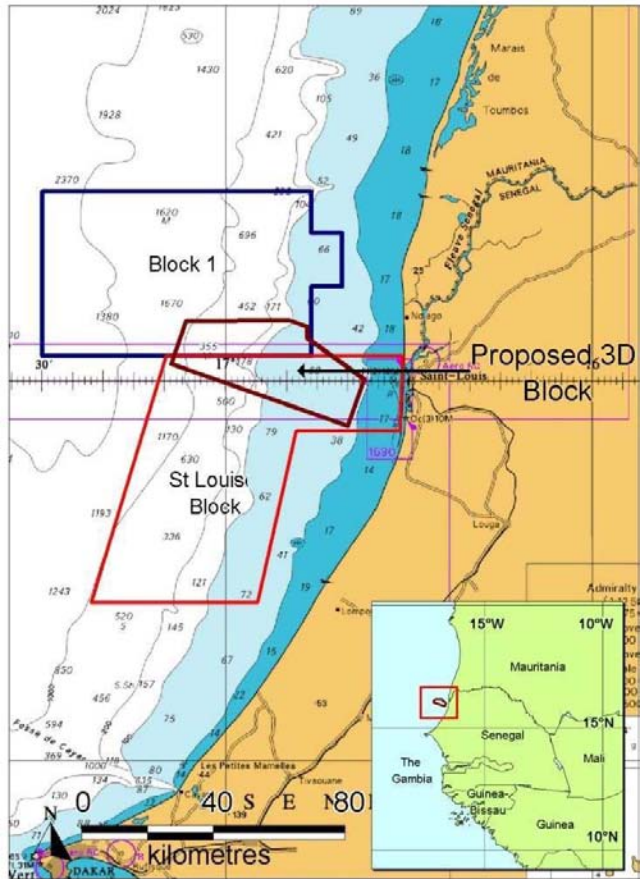
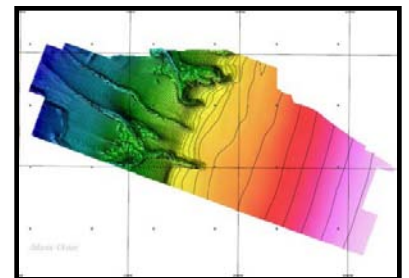


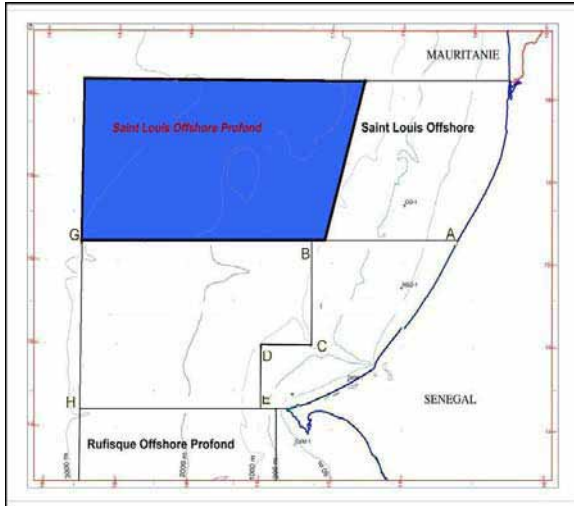
Figure 50: Proposed 3D survey area

Acquisition 620 km² of 3D in March-April 2008
Ibis & Flamengo leads

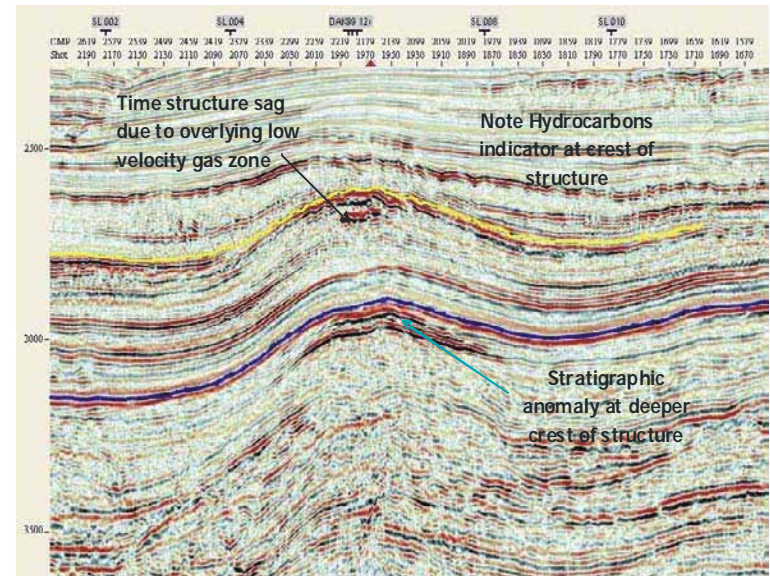
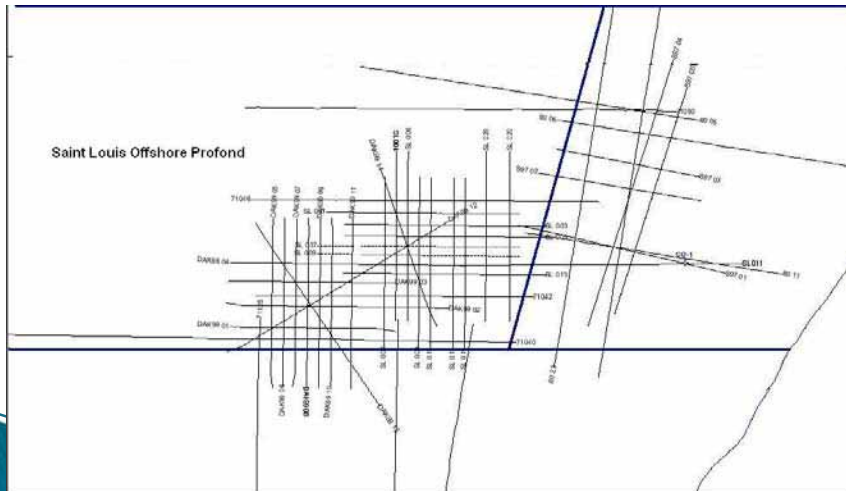
MV Ocean Explorer



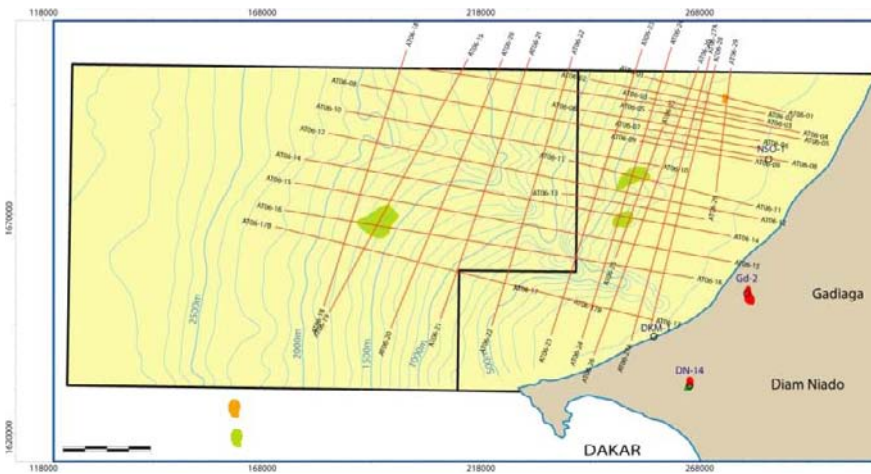
SAINT LOUIS offshore profond



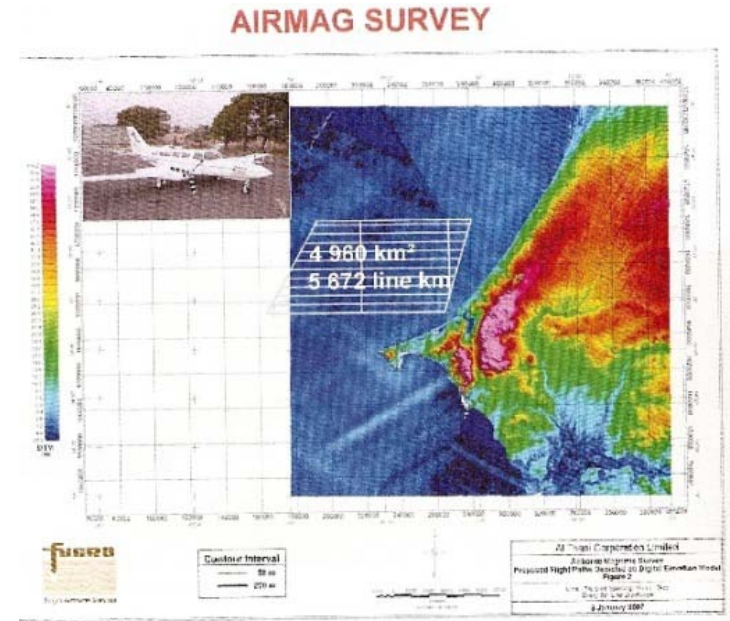
- 1500 Km 2D
- high frequency airmag survey
4225 Km²
5695 line Kms
- Satellite seep study
- economic evaluation
(1.5 TCF)



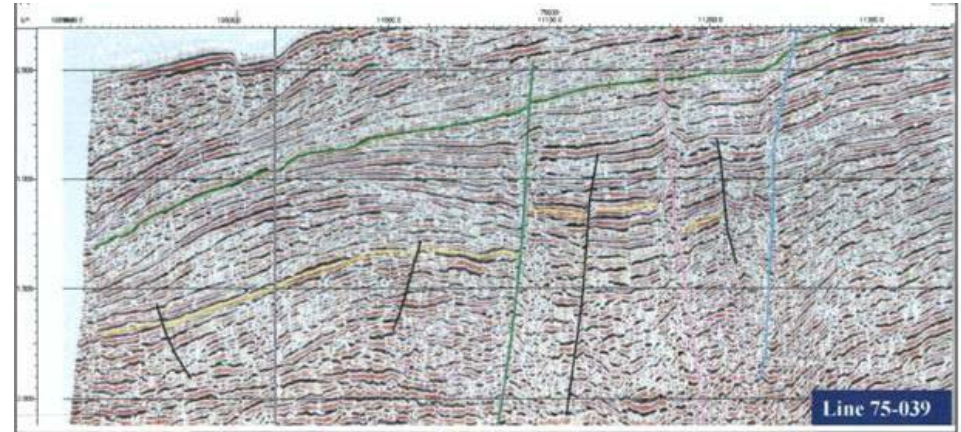
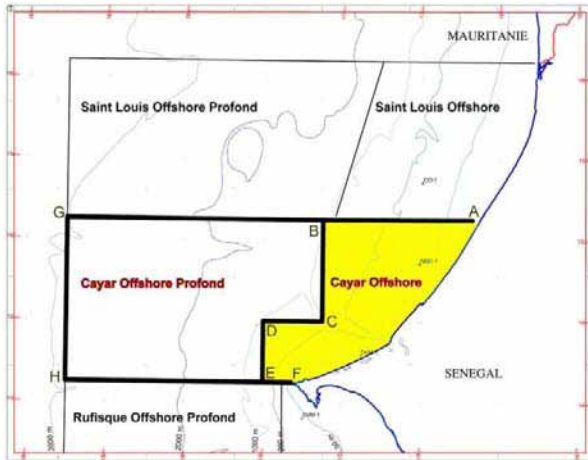
CAYARS offshore blocks



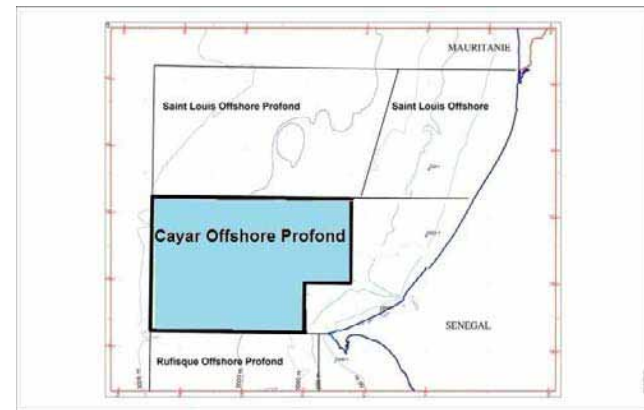
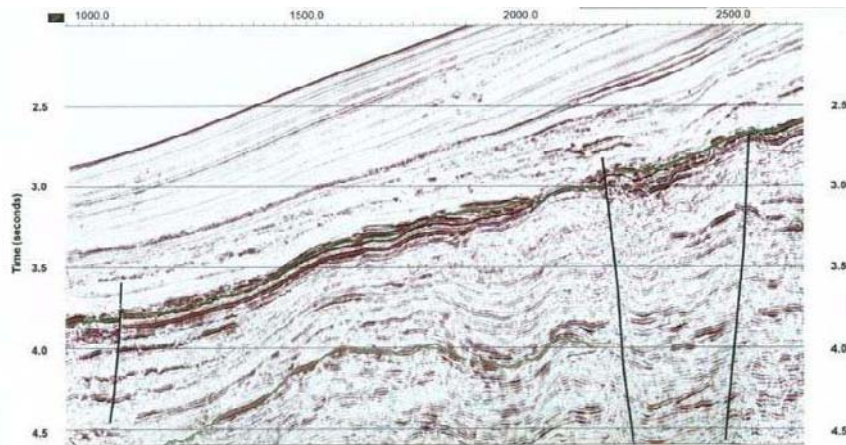
~ 1690 km 2D on March 2006



Airmag survey March 2007



December 2008



RUFISQUE offshore profond

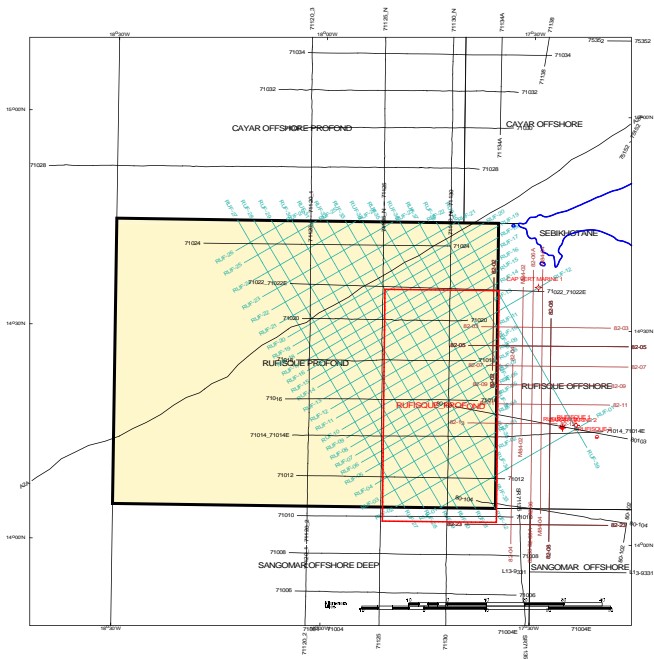


August 2004

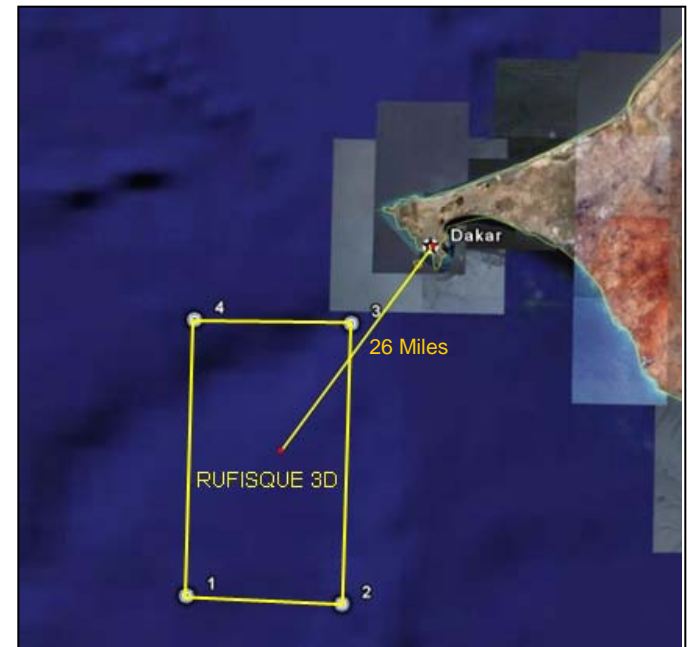
EDISON INTERNATIONAL	55.00%
PETROBRAS	40.00%
PETROSEN	5.00%



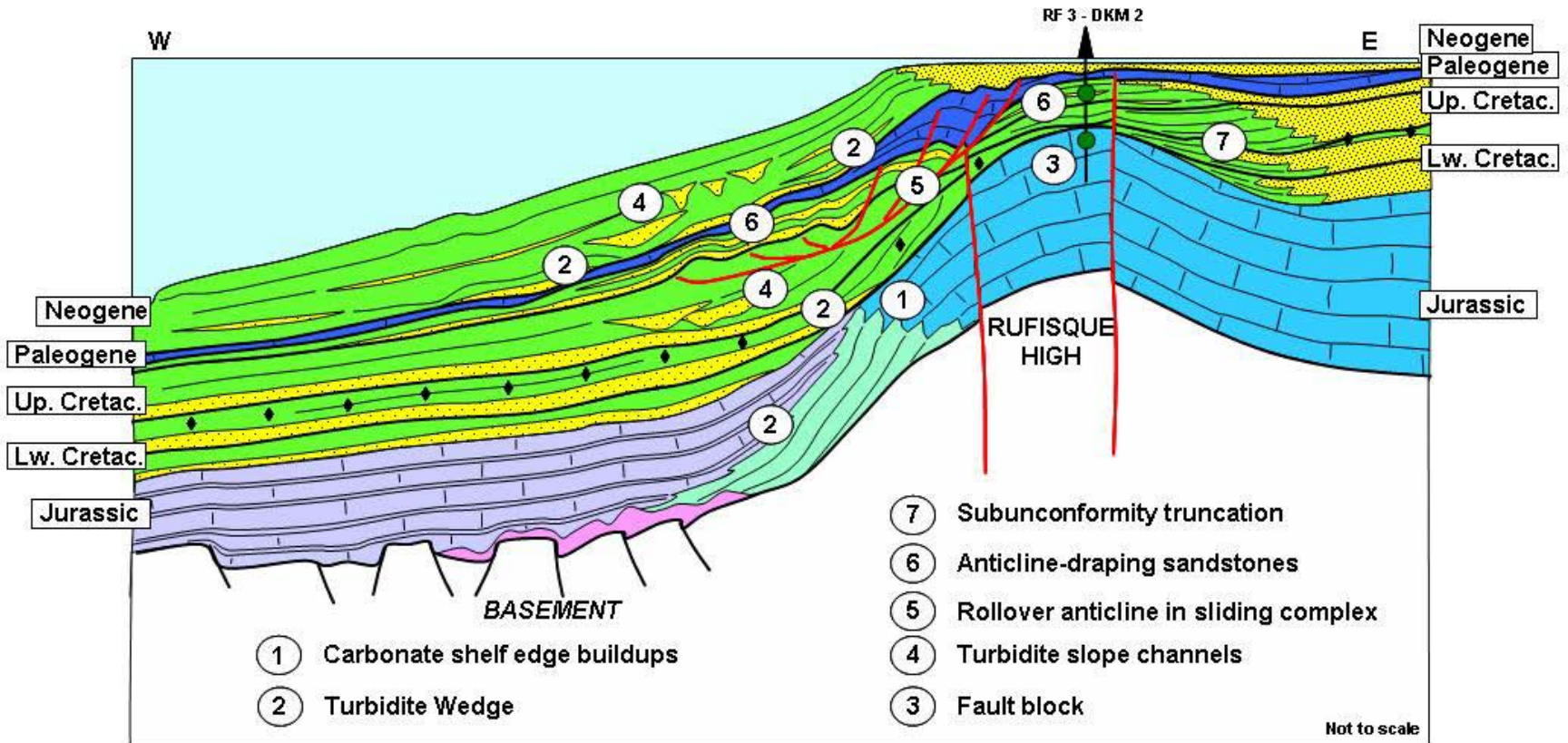
2088 Km 2D Nov/Dec 2004

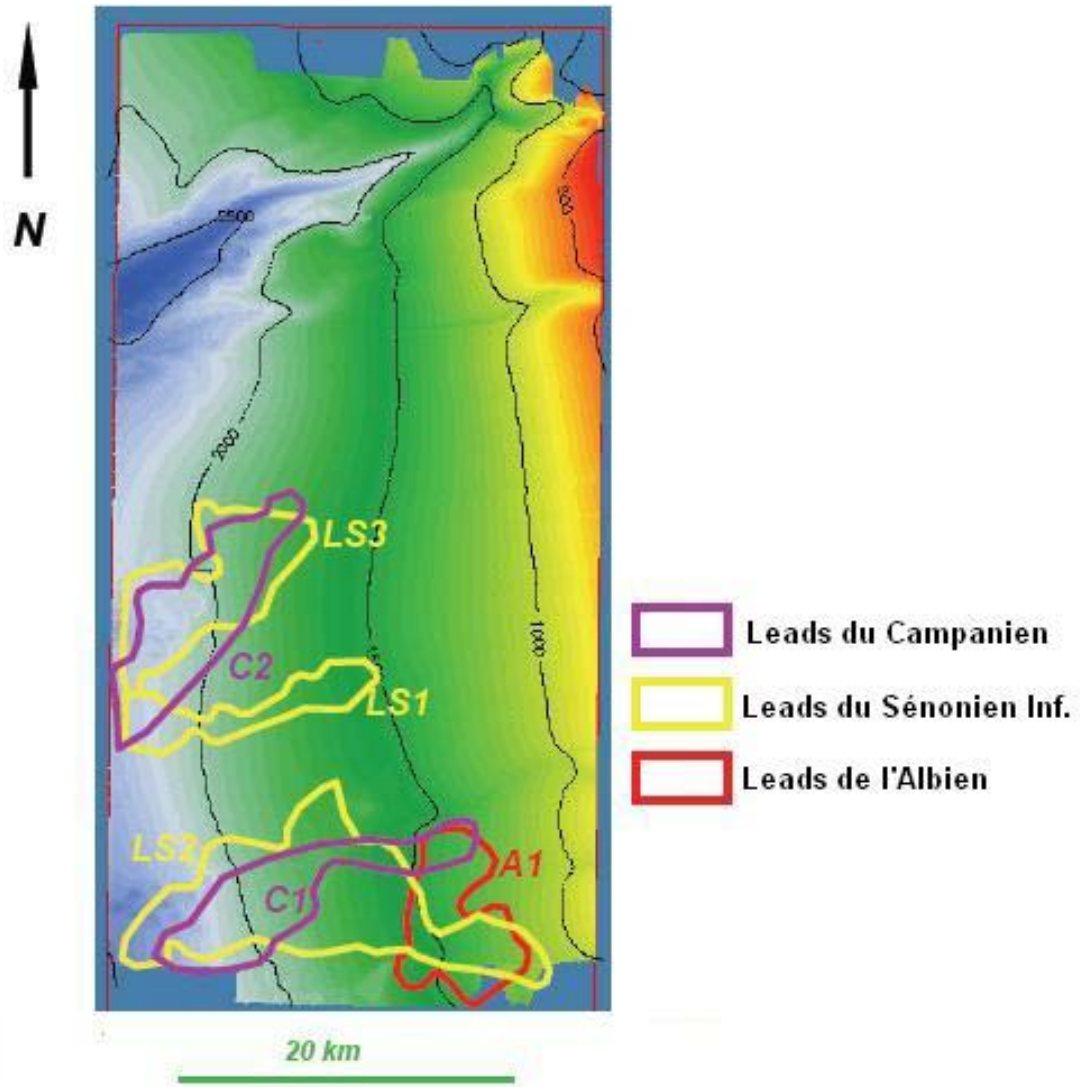


1500 km2 3D Jan/ Feb 2007

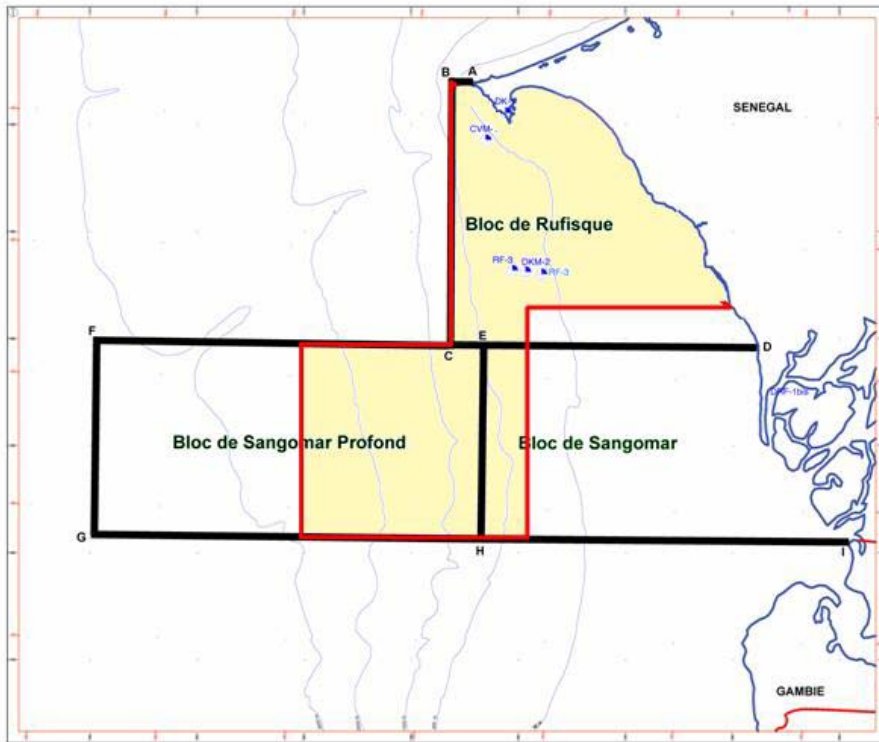


SCHEMATIC PLAY CONCEPT IN DEEP-WATER SENEGAL MARGIN





SANGOMAR - RUFISQUE



November 2004



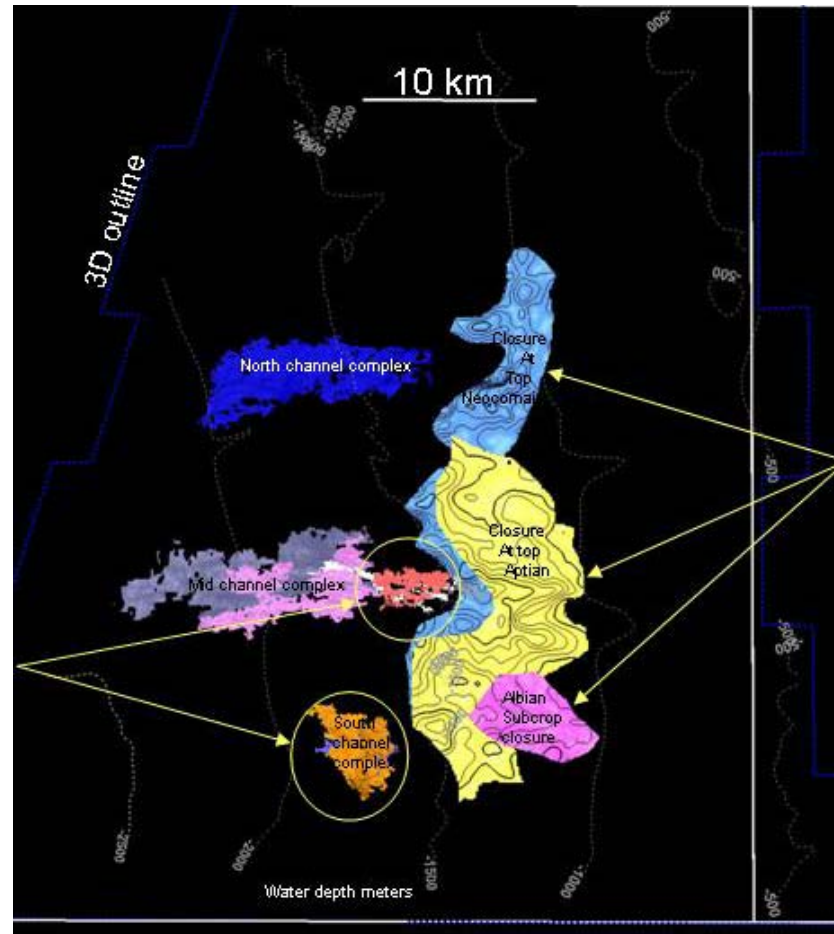
90 %



10 %

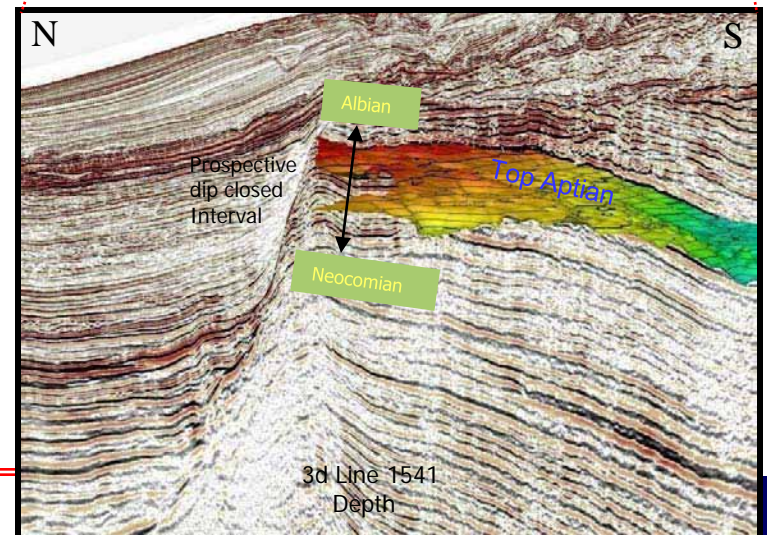
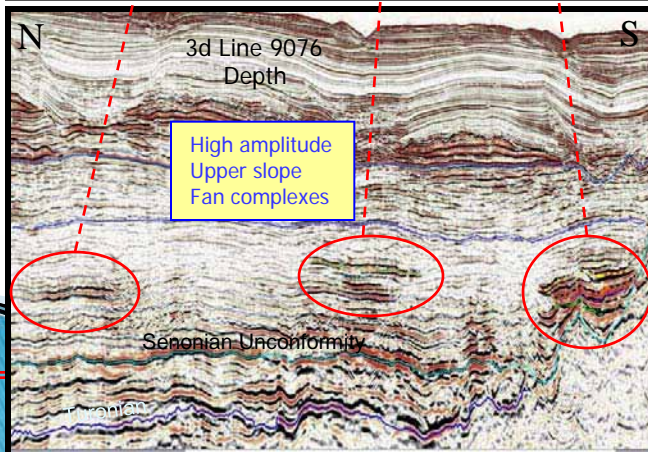
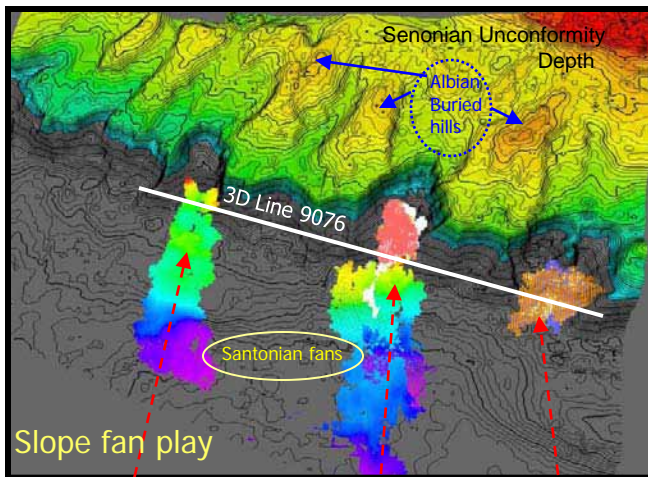
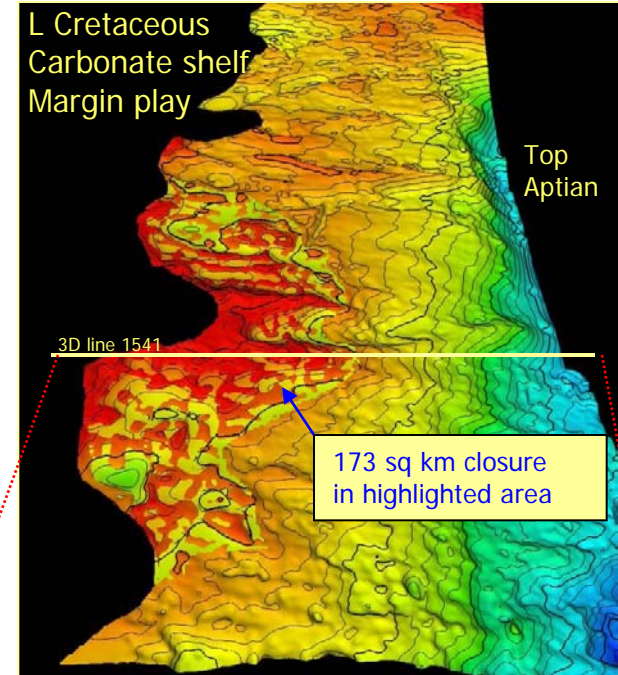
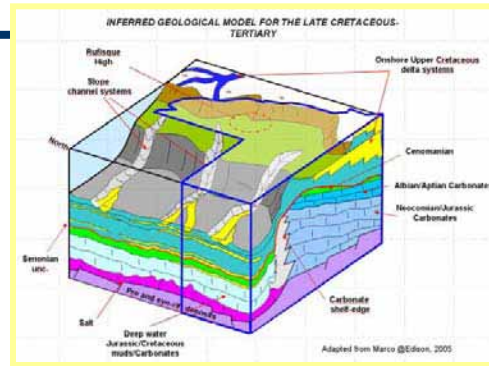
2050 km² 3D
(Feb - Mar 2007)



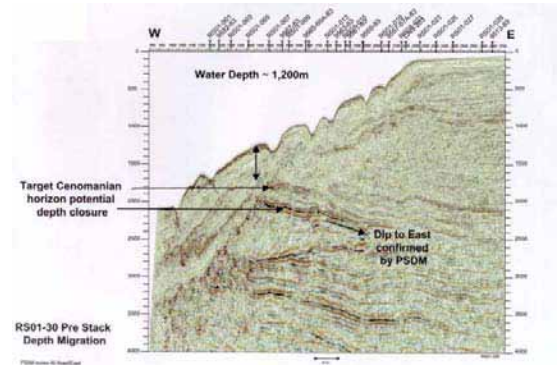
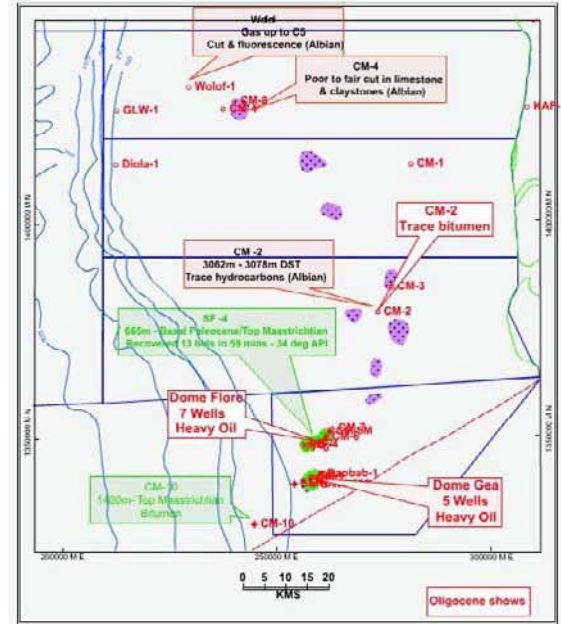
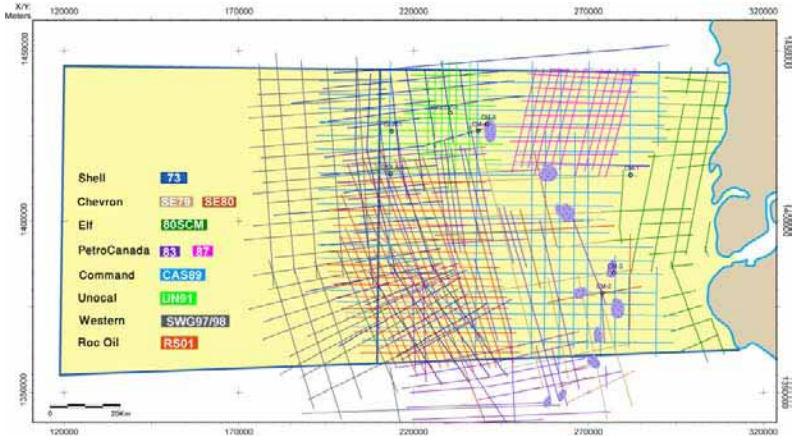
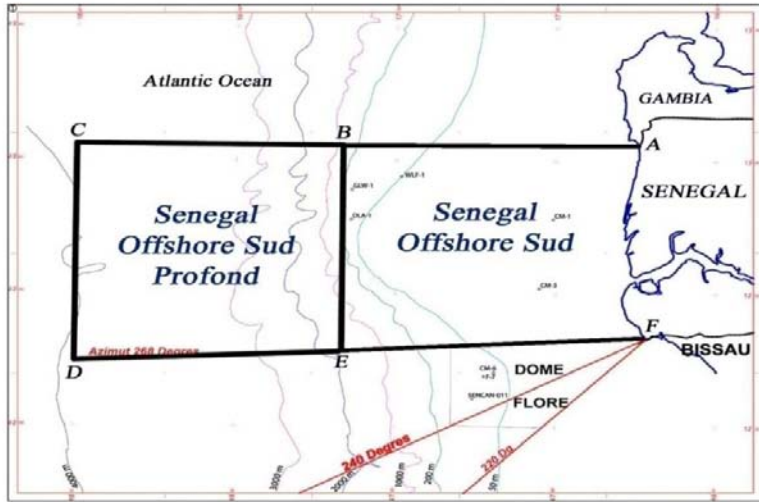


Lower Cretaceous
Carbonate shelf margin
Structural closures

Santonian upper slope
stacked fans
with high amplitudes



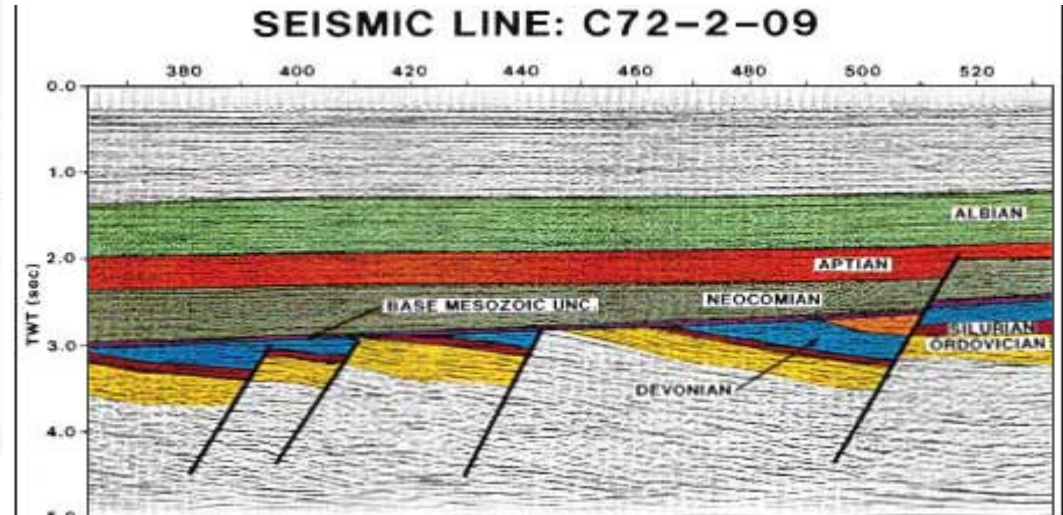
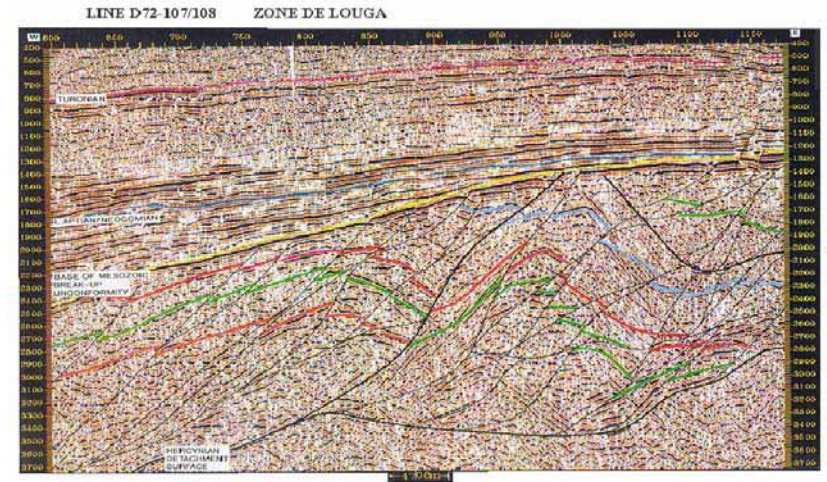
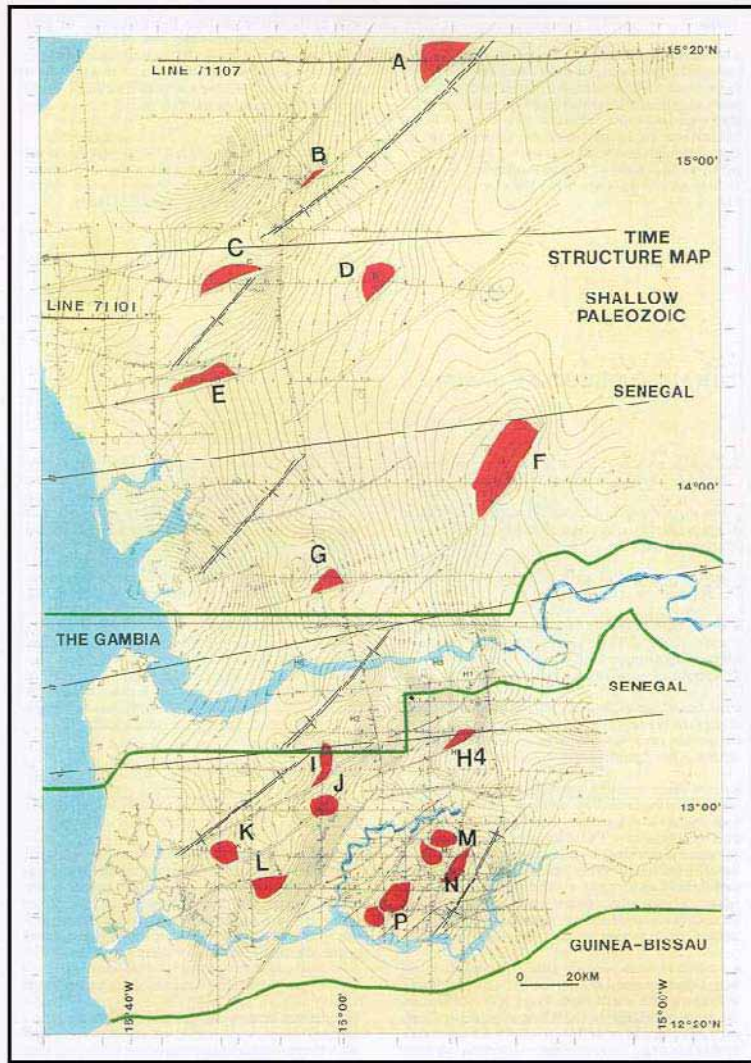
SENEGAL OFFSHORE SUD



PALEOZOIC BASIN

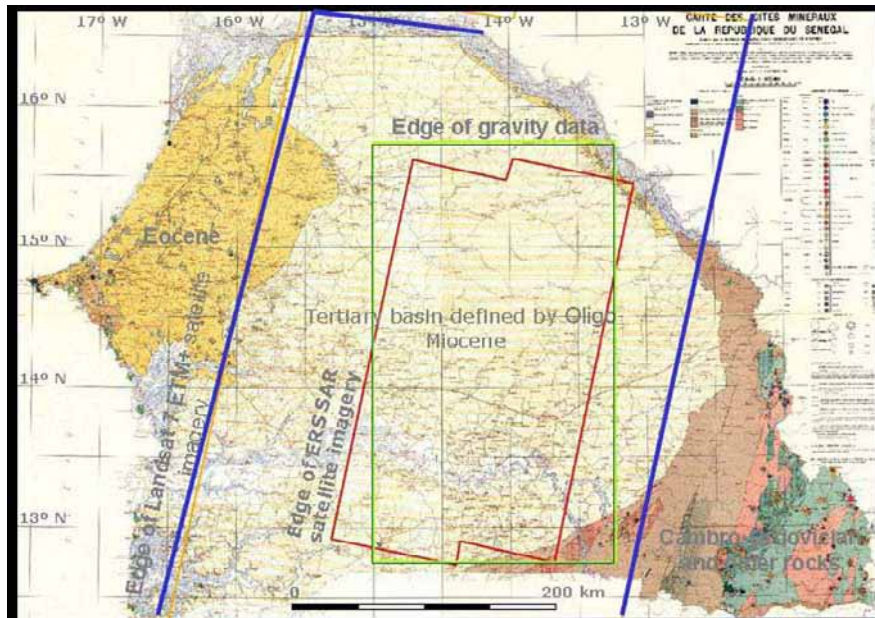


PALEOZOIC BASIN



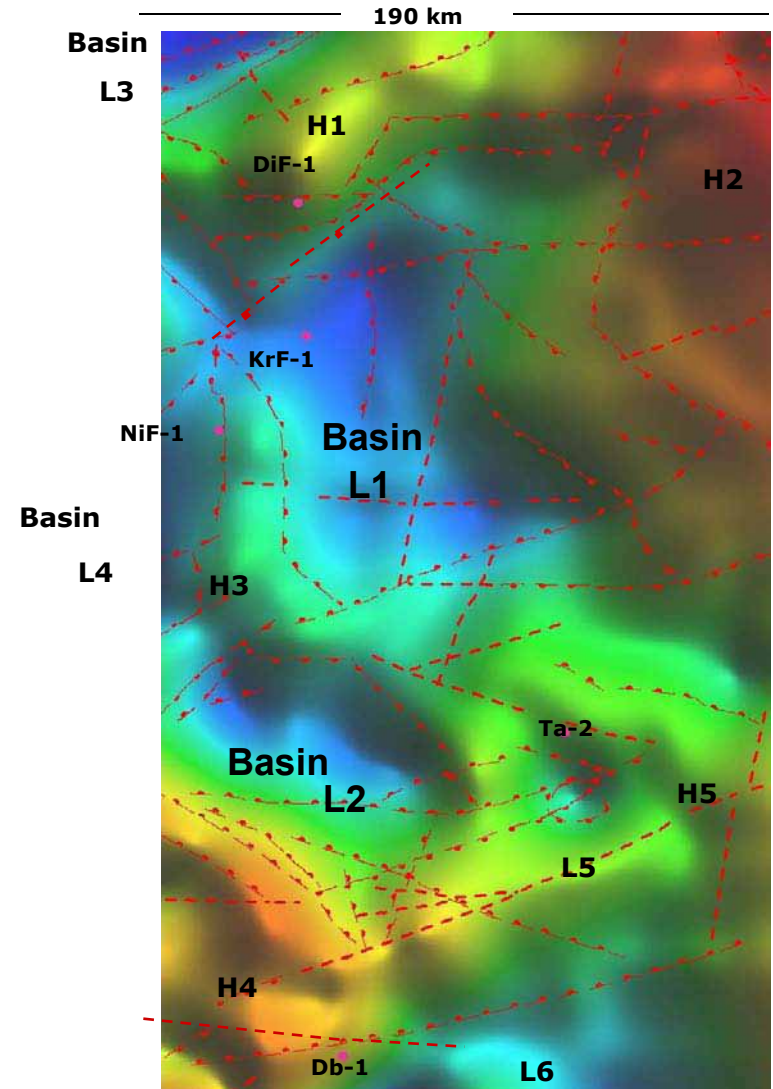
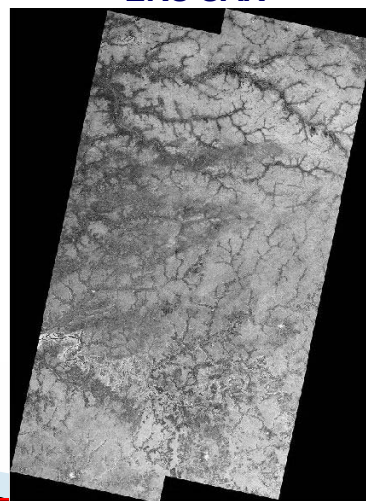
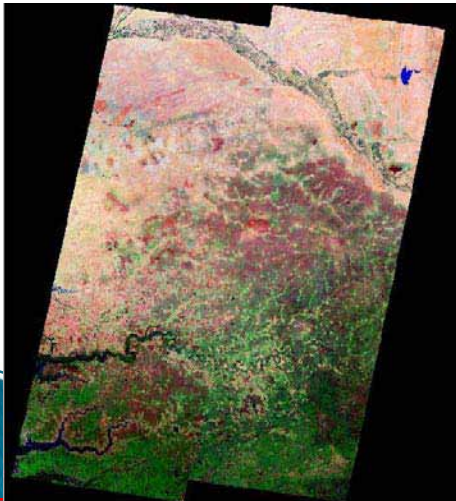
SENEGAL EAST AREA

2 bassins L1 et L2 identified



Landsat 7 ETM+

ERS SAR





LEGAL AND FISCAL TERMS

LAW N° 98-05 of January 08, 1998 (PETROLEUM CODE)

- PRODUCTION SHARING CONTRACT (PSC)

EXPLORATION

- Initial Period: 3-4 years
- Renewal Periods: 2-3 years

EXPLOITATION PERIOD

- Initial Period: 25 years
- Extension Periods: 10+10 years

EXPLORATION WORK PROGRAM & EXPENDITURE OBLIGATIONS

to be negotiated

RETENTION PERIOD

If a discovery is certified non commercial, Contractor may be granted a Retention Period of maximum:

- **3 years** for crude oil
- **8 years** for natural gas

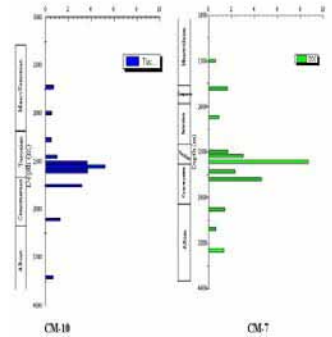
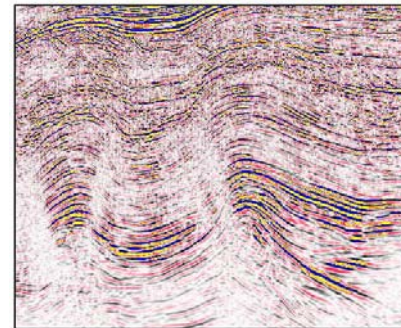
PETROSEN'S PARTICIPATION

- Exploration phases: Carried Interest of 10 %
- After Commercial discovery: Working Interest up to 20 %

FISCAL REGIME

Twenty five per cent (25%) **Income Tax**
(applied on net profit)

- Senegal Basin has generated oil and gas
Diamniadio, Gadiaga and Casamance Dôme Flore
- Presence of world class source rocks in Turonian-Cenomanian
secondary good sources in Albo-Aptian and Jurassic
- Petroleum system in Deep water
with various structural trends and traps
- 60 000 km² underexplored Paleozoic basin
with good reservoirs in Ordovician and Devonian
and good source in Silurian, and traps and plays
identified



Law with flexible terms