Is the Black Sea the Next North Sea?

IENE Conference
Thessaloniki, May 30/31 2012
1 – Paleo Kamchia River; 2 – Paleo Dnepr-Dnestr River; 3 – Paleo Don River; 4 – Paleo Rioni River; 5 – Paleo Maritza River; 6 – Recent Danube River
BLACK SEA AS COMPARED TO NORTH SEA
Comparison Black Sea vs. North Sea

<table>
<thead>
<tr>
<th>Black Sea-Deep Sea</th>
<th>North Sea</th>
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<tbody>
<tr>
<td>• Less than 100 Wells drilled</td>
<td>• More than 7000 wells drilled</td>
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<tr>
<td>• Widely Unexplored</td>
<td>• First 75 wells dry</td>
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<tr>
<td>• Black Sea Deep Water one of World’s last Frontier Areas</td>
<td>• Open political system</td>
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<tr>
<td>• Only One Major Discovery in Neptun Block / Romania</td>
<td>• Industrial focus over 30 years</td>
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<td>• (Gas Hydrates: 3000 Yrs Current Gas Production??)</td>
<td>• Declining Production</td>
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The North Sea Story

World 4\textsuperscript{th} largest oil – producing area

World 3\textsuperscript{rd} largest gas – producing area

Cumulative gross revenues of approx. 1500 Billion US$

500,000 person-years of effort to understand Geology

300,000 jobs onshore – 50,000 jobs offshore

Cum. production about 48 Billion bbl oil and 127 TCF gas
The Black Sea Story

Remaining HC Estimate

Remaining Hydrocarbon Potential estimate
USGS Study 2000

2.3 Bill BOE

2.6 Bill BOE

561 MM BOE

>2.0 Bill BOE

>5.0 Bill BOE

Remaining HC Estimate
WESTERN BLACK SEA – Gas Seeps
Black Sea-Deep Sea – Gas Seeps
Is Nabucco dead? According to “Die Presse”, Saturday 26 May 2012: No, i.e. from Turkish border to Baungarten-Nabucco West, from Turkish border to Azerbaijan Tanap (with Socar)? Reason: EU Legislation (requires supply competition), TR and AZ may not agree. Three possible competitors: TAP (TR to IT), Nabucco West and Seep (parallel to Nabucco West), Russia and Iran wild card (is Caspian Sea a Lake or Sea-question; if Sea: Ru and IR could claim rights to pipelines).
Major Mesozoic Ridges, Thicker Tertiary sediments on the western part of the BS, than on the Eastern Part, Bega et al. 2010.
Western / Mid Black Sea – Deep Sea
Significant Exploration Opportunities

Polshkov Ridge – Bulgarian Offshore
• Various different **Play Types** have been identified
• Defined by several **Fault Blocks**

Tetyaev High – Offshore Ukraine
• Same play like Andrusov, but Western black sea has thicker **tertiary sediments** as compared to the eastern BS

Andrusov Ridge
• Mid Black Sea – Offshore Turkey **was drilled** - 2 wells dry

Shatzky Ridge
• Offshore Russia/Caucasus, needs **more exploration**
Western Black Sea Basin – Deep Sea

- Shallow water-moderately explored
- Deep water - frontier region

- Romania
- Ukraine
- Russia
- Bulgaria
- Galata Field
- Polishkov Ridge
- Turkey
- Domino-1
Bulgaria and Polshkov Ridge

• **Shallow Waters**
  1995-Galata Discovery (Texaco, Exxon, OMV), Tested then 34 MMcf Gas

• **Polshkov Ridge**
  High Potential Identified in Block **Offshore Varna** (Former OMV Block ‘Varna’) on Polshkov High - Primary Target Post Mesozoic Sequence

  • Gabor Tari et. al. Identified at Least **three to four Post Mesozoic Deepwater Plays** - Segment Severely Underexplored

• **Recoverable** Gas Resources Estimated at > **10 Tcf**
Romania - Deep Sea Discovery: Domino-1

- First Deep Sea Drilling at 3000 m Depth, 970 m Water Depth
- Gas Horizon 70.7 m (Operator Exxon, Petrom)
- Estimated Reserves: 1.5 to 3 Tcf
- Investment of Several Billion USD required
- Possibility to Combine with Bulgarian Polishkov Ridge?
According to Bega et al. 2010: Structural trends at Lower Pontian deposits are not scattered but aligned in trends in the Northern Margin. They mimic the Scythian Platform margin, suggesting that they are genetically related with tectono-genesis of northern areas. (b) Simplified geo-seismic section through the Northern Margin. Most structuration appears in the lower Pontian sequence, mainly due to gravity-driven tectonics. The toe thrust was active until the end of the Pontian.
Deep Sea Ukraine: Forosa and New Skifska Area

- East European Platform
- Azov Sea
- Crimea Peninsular
- Western Black Sea Basin
- Pry-Kerch Shelf
- Odessa Shelf
- New Skifska Area (12600 sq. km)
- Forosa Area (7000 sq. km)
Forosa and New Skifska Area

Recoverable Resources:

Skifska: 80-100 M toe
Forosa: 130-150 M toe

Expected Annual Production:

Skifska: up to 3 M toe
Forosa: up to 4 M toe

Source: Dr. Volodymyr Ignashchenko
Secretary of PSA Inter-Agency Commission, Ukraine
Eastern and Southern Black Sea

- Shallow water - moderately explored
- Deep water - frontier region

From Block Varna – Engagement in All Other Directions

Countries:
- Romania
- Ukraine
- Russia
- Bulgaria
- Turkey
- Georgia
- Polishkov Ridge
- Galata Field
- Domino-1
Black Sea - Studies


**Shatzky Ridge, Offshore Russia:** Large Structure, Seen by **Meisner et al.** and **Edwards et al.**

• **Turkish Black Sea:** Numerous Exploration Targets Described by **Menliki et al.**

**Western Black Sea:** **Tari et al.** describes Polshkov Ridge High Potential (see above), **Bega and Ionescu** Outline Romanian play types leading to Domino-1 Discovery, **Duley and Fogg** Promote Technical Success to Romanian Black Sea
SAVGroup
Petroleum Management

BLACK SEA
One of the Last Deep Water Frontier Area in the World

The Coming HC *(north)* - Sea??
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