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 Basin

Robinson et al. (1996)
Biogenic (and thermogenic?) gas in the NW Black Sea

Rising methane bubbles (gas flares) seen on single-beam echograms
Dnepr paleodelta, Ukraine

Gas flares and gas-hydrates in the Dnepr paleodelta area, Skifska, offshore Ukraine

Source: OMV – AG congress Presentation
Eastern and Southern Black Sea

Shallow water - moderately explored Deep water - frontier region

From Block Varna – Engagement in All Other Directions

Romania

Crimea

Russia

Georgia

Bulgaria

Polshkov Ridge

Galata Field

Domino-1

Turkey
Polshkov Ridge – Western Black Sea

• Various different Play Types have been identified
• Defined by several Fault Blocks

Tetyaev High – North West Black Sea

• 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 – North East Black Sea

• Offshore Russia/Caucasus, needs more exploration
History:

-- Deep-water hydrocarbon exploration drilling began less than 20 years ago

-- **Economical/technological** challenges associated with mobilizing suitable rigs through the Bosporus

-- To end 2017, c. 20 deep-water wells have been drilled, targeting a large variety of plays in this underexplored basin
Observation:

-- Recent discoveries have underlined the presence of active and effective petroleum systems that cover large parts of the deep-water Black Sea Basin

Detailed study of deep-water Black Sea by:

“History of deepwater exploration in the Black Sea and an overview of deepwater petroleum play types”
G. C. TARI & M. D. SIMMONS, OMV Exploration & Production GmbH, Trabrennstrasse 6-8, A-1020 Vienna, Austria-Halliburton, 97 Jubilee Avenue, Milton Park, Abingdon, OX14 4RW, UK
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 Polshkov Ridge?
North West
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
Bulgaria and Polishkov Ridge

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

• **Polishkov Ridge**
  High Potential Identified in Block **KhanAsparuch** on Polishkov High - Primary Target Post Mesozoic Sequence

• Gabor Tari et. al. Identified at Least **three to four Post Mesozoic Deepwater Plays** - Segment Severely Underexplored
BLACK SEA AS COMPARED TO NORTH SEA
COMPARISON BLACK SEA vs NORTH SEA

Black Sea-Deep Sea
• Less than 20 Deepwater Wells drilled
• Largely Unexplored
• Black Sea Deep Water one of World’s last promising Areas
  (Gas Hydrates: Hundreds of Yrs Current Gas Production?)

North Sea
• More than 7000 wells drilled
• First 75 wells dry
• Industrial focus over 30 years
• Declining Production
THE BLACK SEA STORY

Remaining Hydrocarbon Potential estimate
USGS Study 2000

2.3 Bill BOE
2.6 Bill BOE
5.4 Bill BOE
561 MM BOE
>B2.0 Bill BOE
>5.0 Bill BOE

Remaining HC Estimate
THE NORTH SEA STORY (as of 2010)

- World 4th largest oil – producing area
- World 3rd 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
Black Sea and the New Economic/Political Situation

- Plenty of HC resources available
  - O/G Projects currently less economic
- Required Oil price needs to be $80 to $100
- Europe plans to diversify gas imports in future
- S. Stream dropped for Turkishstream
- N. Stream 2, parallel Line to N. Stream
- Can Black Sea compete with North Sea?