MAIN FEATURES OF THE EURASIAN CONTINENTAL MARGIN MORPHOLOGICAL STRUCTURE IN THE ARCTIC OCEAN

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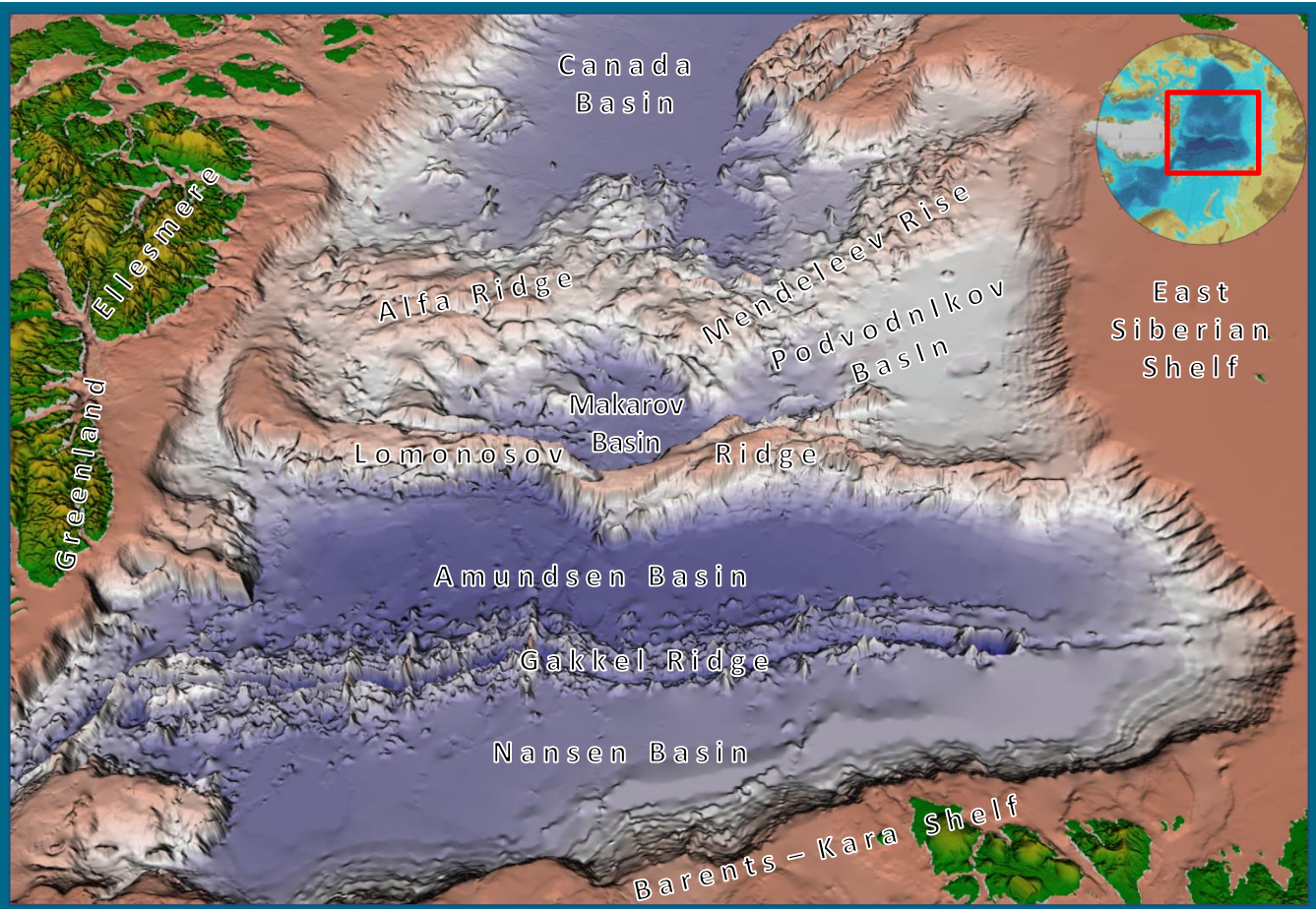
BATHYMETRIC VIEW OF THE ARCTIC OCEAN



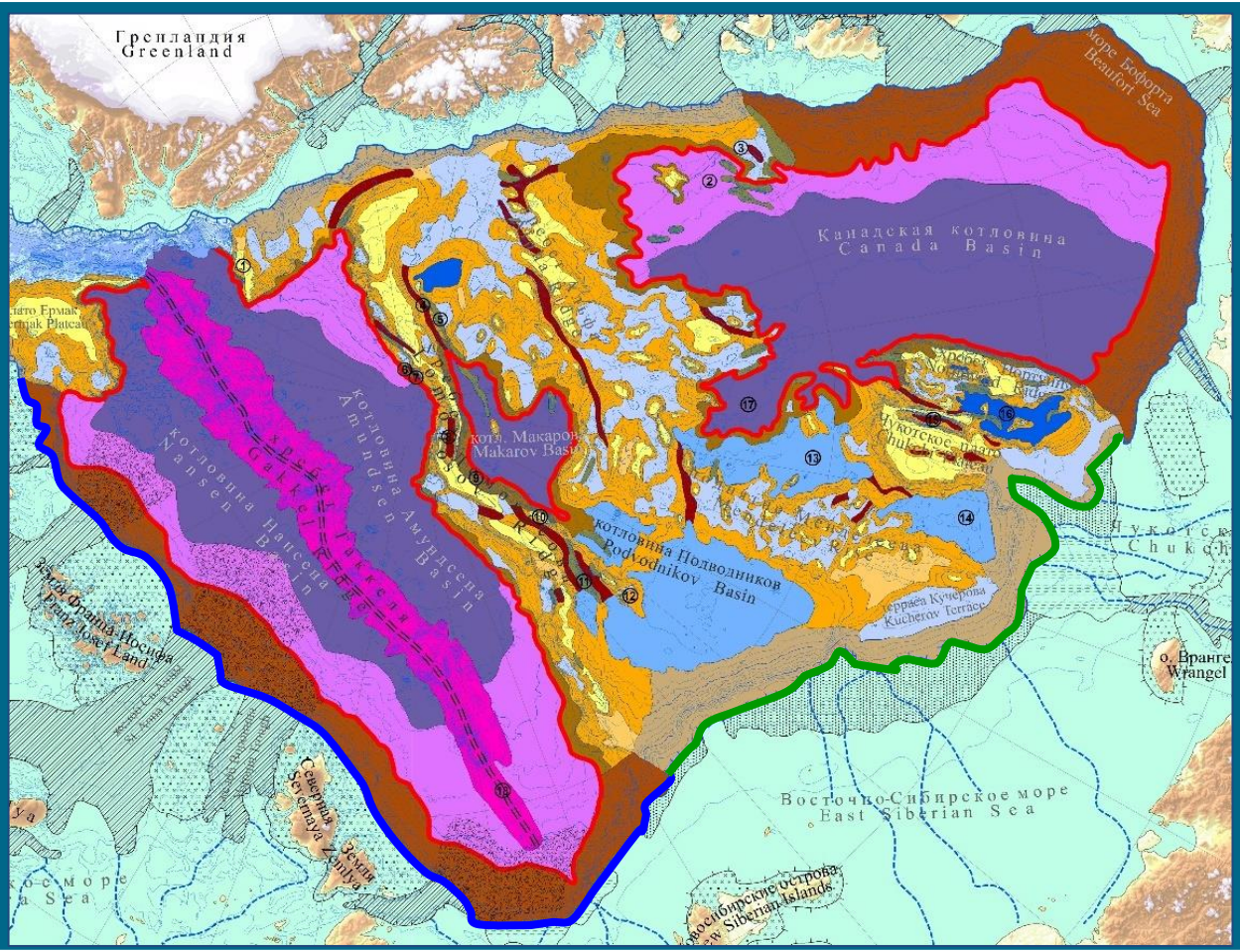
IBCAO v.3

The result of the Arctic Ocean bathymetry interpretation is a geomorphological map (scale 1:5M).

Geomorphological map was constructed based on:

- Russian Bathymetric Map of the Central Arctic Basin;
- IBCAO map, version 3;
- Russian multi-beam and single-beam surveys conducted in 2010, 2011 and 2014.

GEOMORPHOLOGICAL MAP OF THE ARCTIC OCEAN

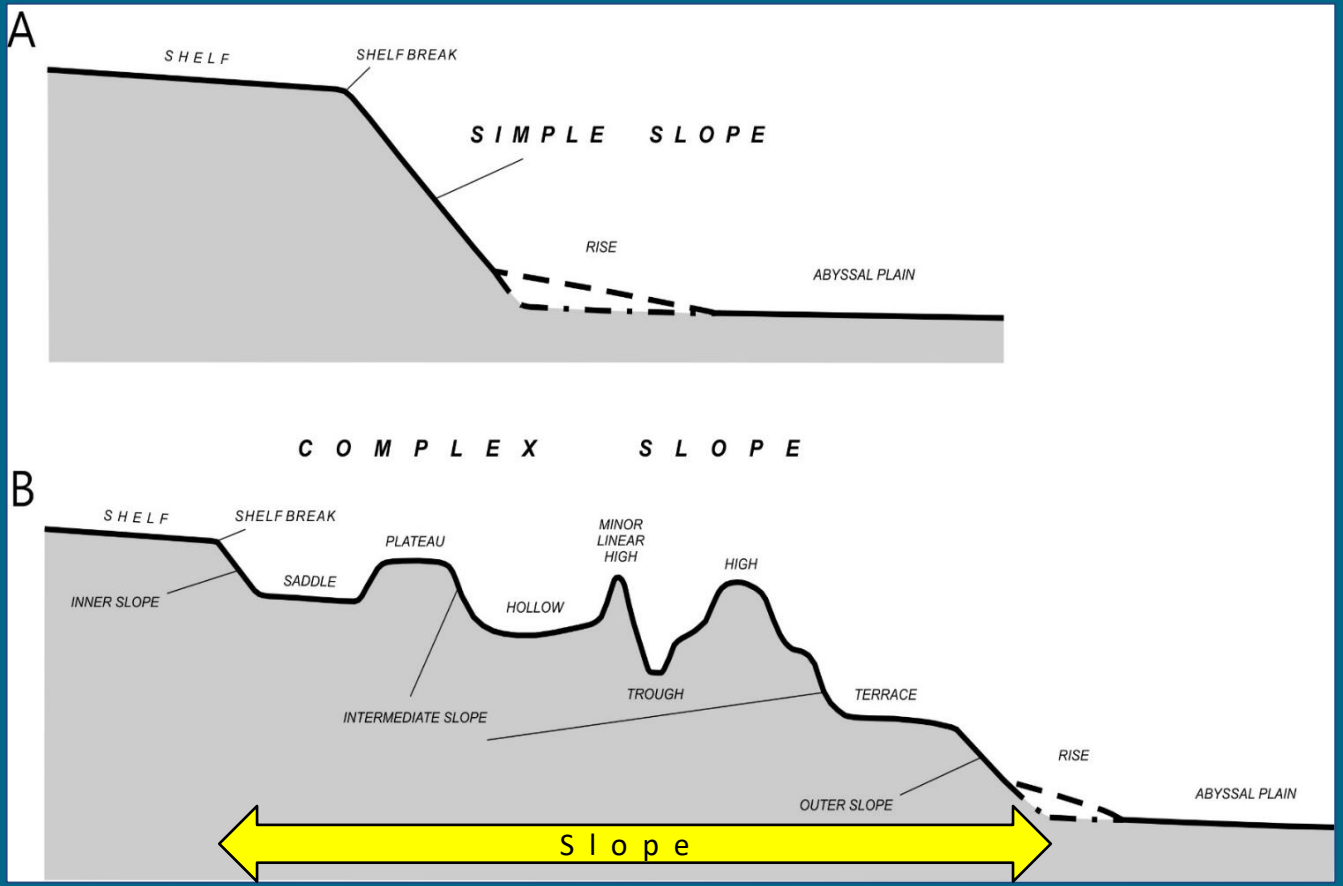


The main criterion of the morphological boundaries is maximum changes of the seabed surface profile gradient.

Two types of slope along the Eurasian continental margin are indicated:

- Simple slope (blue line);
- Complex slope (green line).

THE SCHEMES OF SIMPLE AND COMPLEX CONTINENTAL SLOPES



Symonds et al., 2000

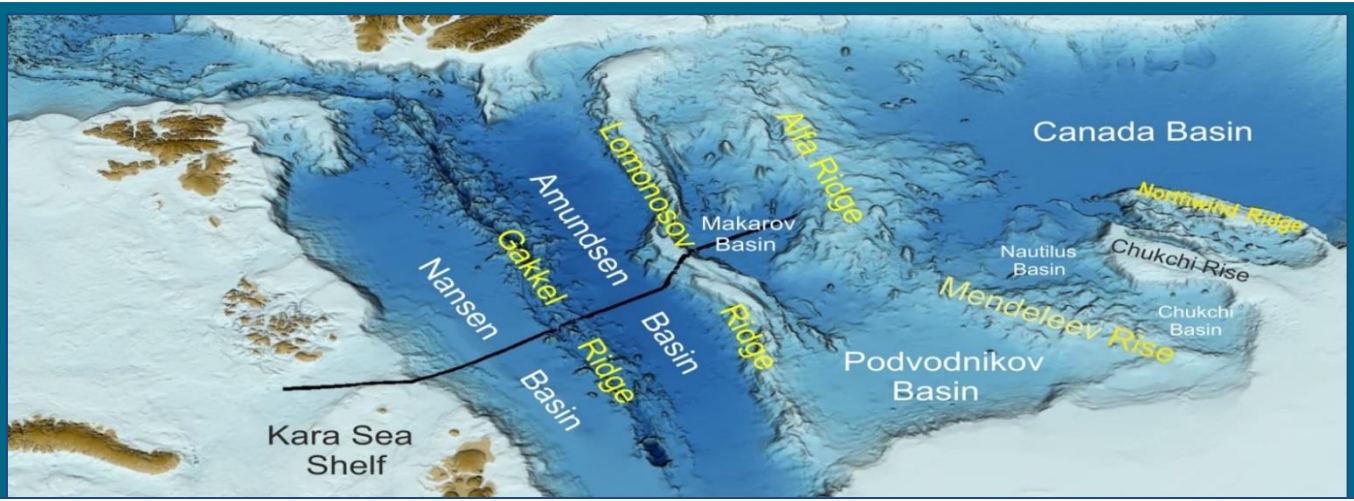
Simple slopes

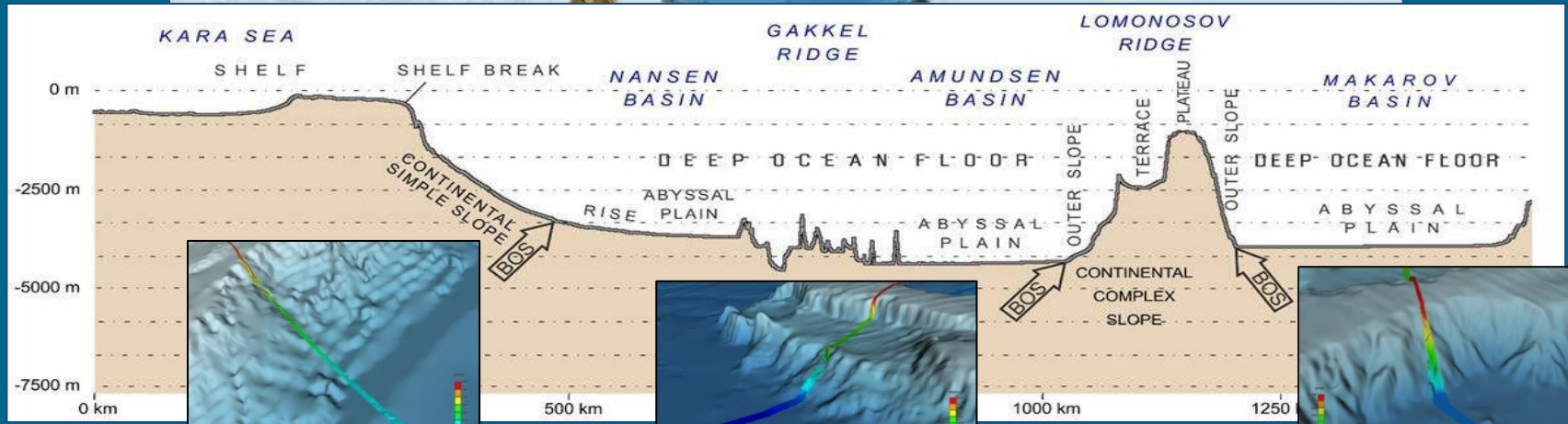
begin at the shelf break and are traced without significant complication of topographic forms down to the rise, and in case of its absence – down to abyssal plains.

Complex slopes

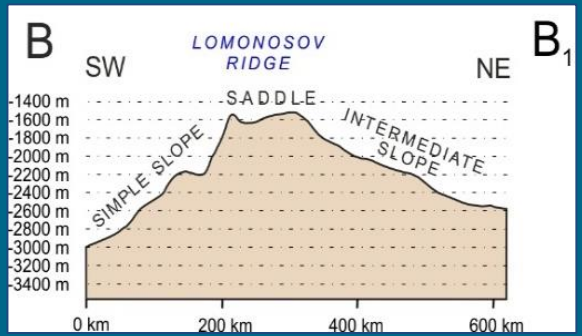
are characterized by a complex structure. Beginning at the shelf break of the Arctic seas they are traced down to abyssal plains with significant complication of topographic forms as series of terraces, saddles, plateaus, hollows, highs and etc.

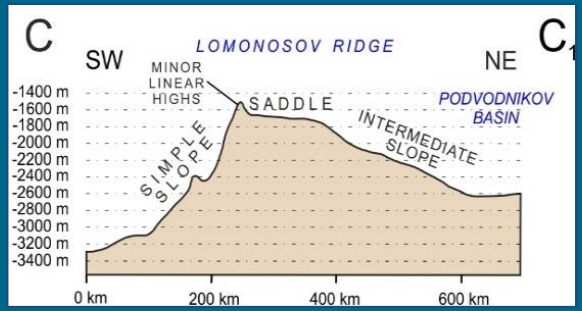
REGIONAL BATHYMETRIC PROFILE ALONG SEISMIC LINE 1407

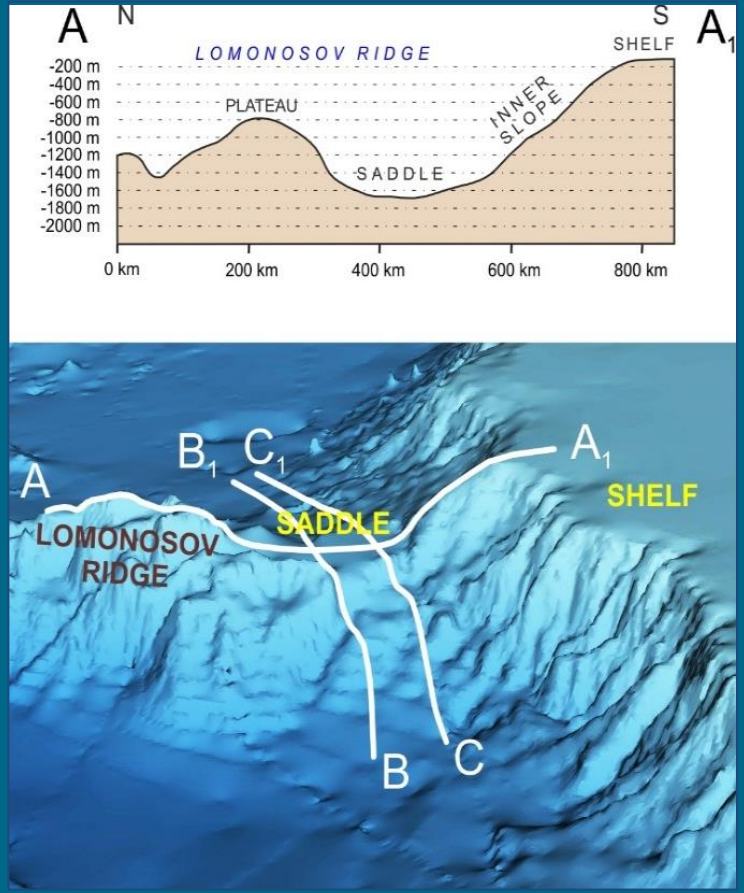




THE LOMONOSOV RIDGE AND THE EAST SIBERIAN SHELF



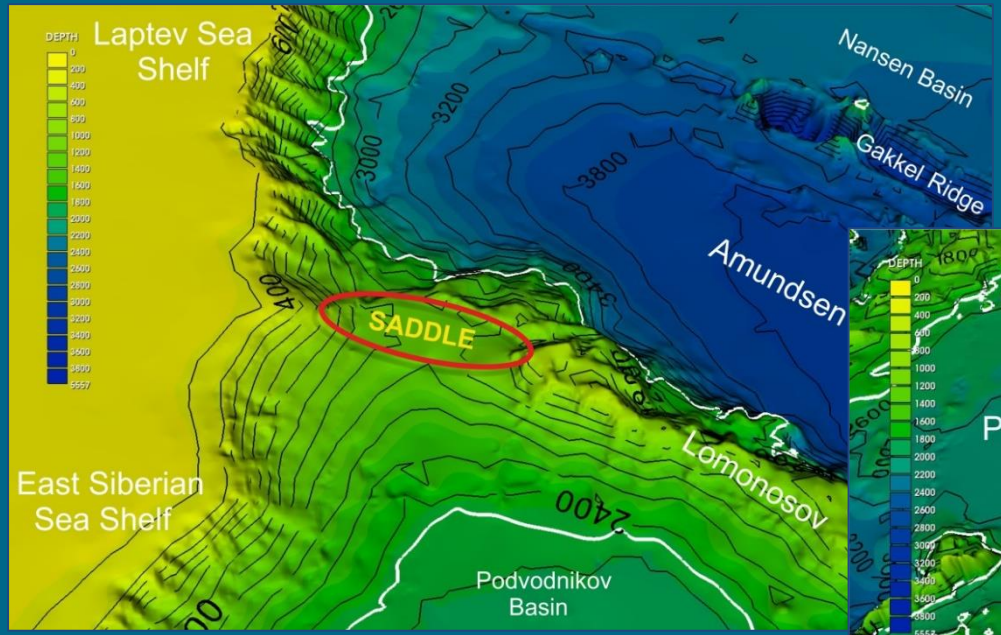




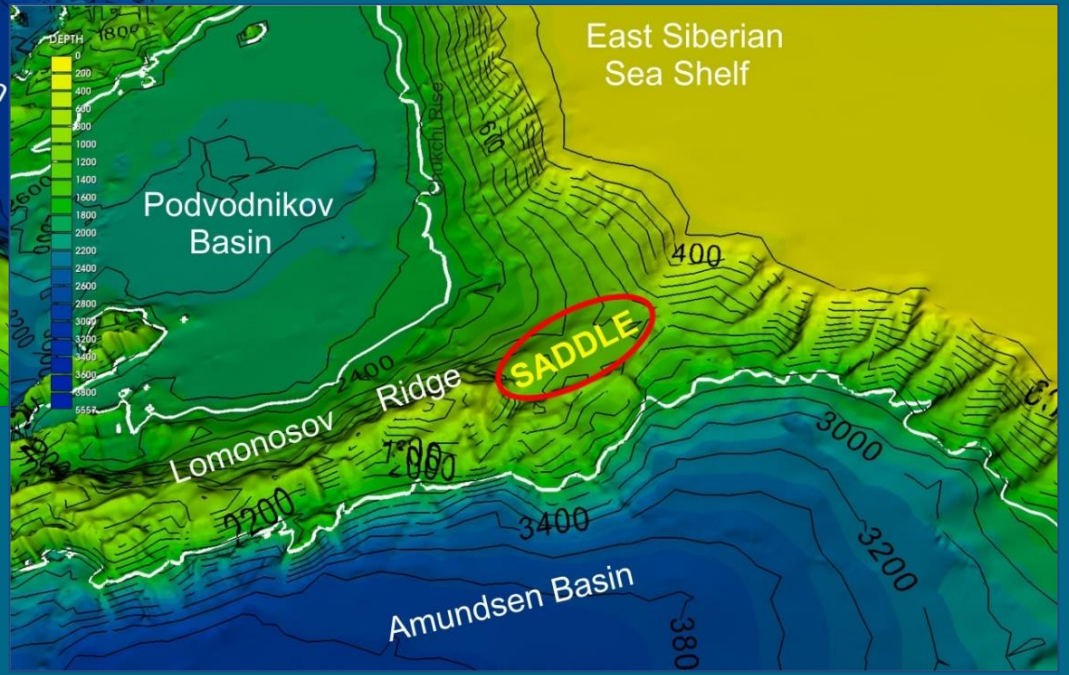
The junction between the Lomonosov Ridge and the East Siberian Shelf is presented by a saddle with depth about 1600 m, which is subsided for about 1200 m relative to the shelf break.

At the same time the saddle rises for more than 1600 m above the base of the western slope of the Ridge (i.e. the Amundsen Basin) and above the base of the eastern slope of the Ridge (i.e. the Podvodnikov Basin).

THE LOMONOSOV RIDGE AND THE EAST SIBERIAN SHELF

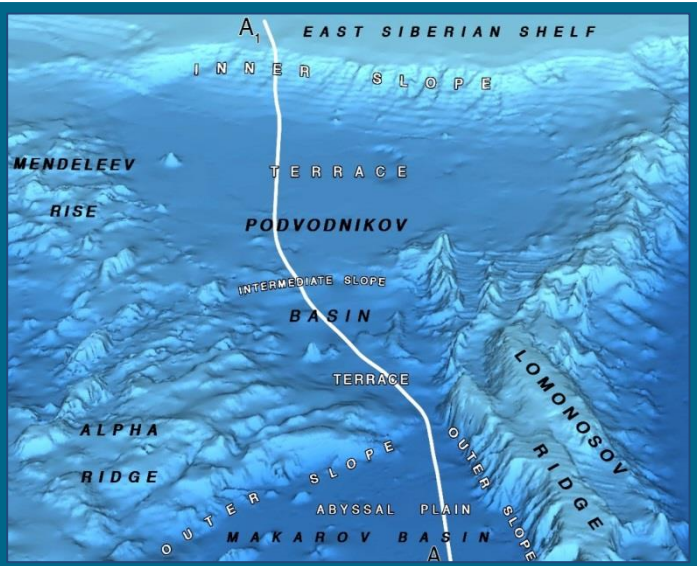


Bathymetric model IBCAO 3.0 (interpreted in Geocap) of the Eurasian part of the Lomonosov Ridge



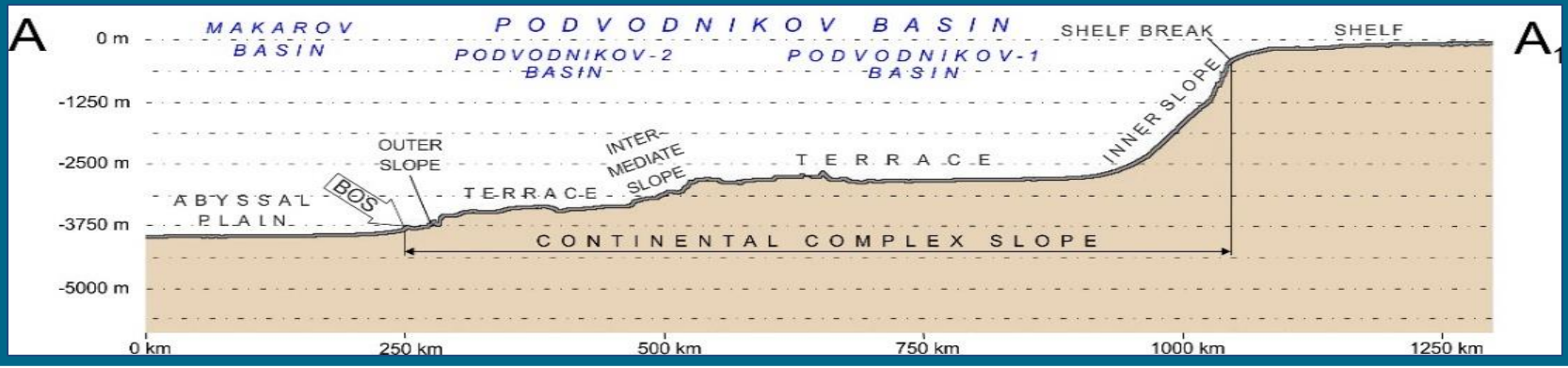
The Lomonosov Ridge is not separated from the continental margin. The Ridge is a part of the margin.

THE PODVODNIKOV BASIN AND THE EAST SIBERIAN SHELF

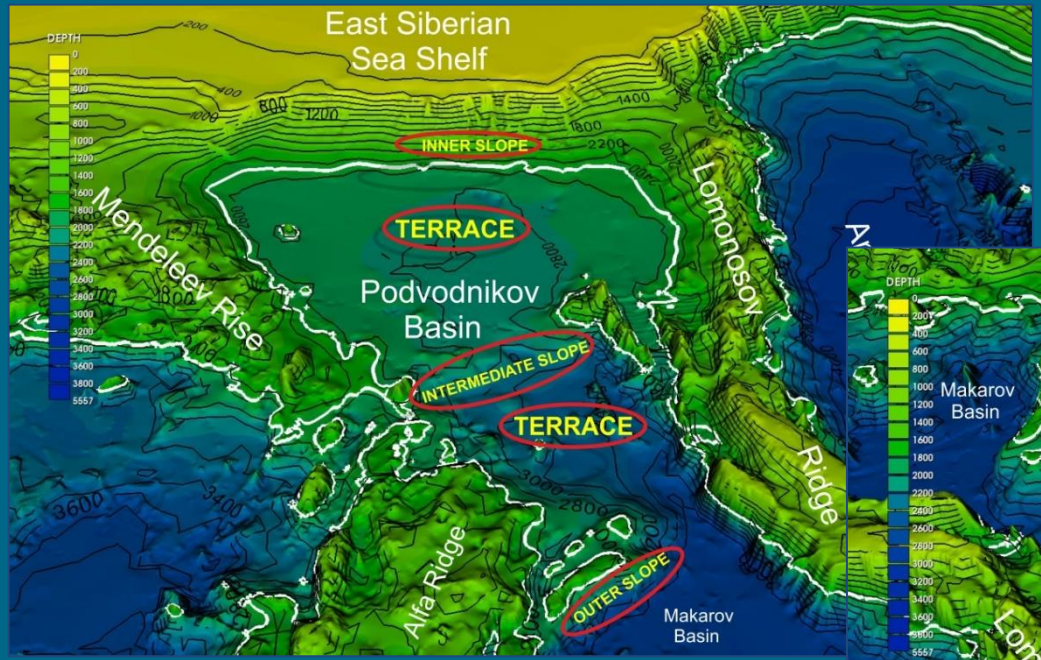


The 3D model and bathymetric profile show a complex structure of the continental slope including the inner slope on the border with shelf and the outer slope on the border with the abyssal plain in the Makarov Basin. The bottom of the Podvodnikov Basin is represented by two terraces separated by an intermediate slope.

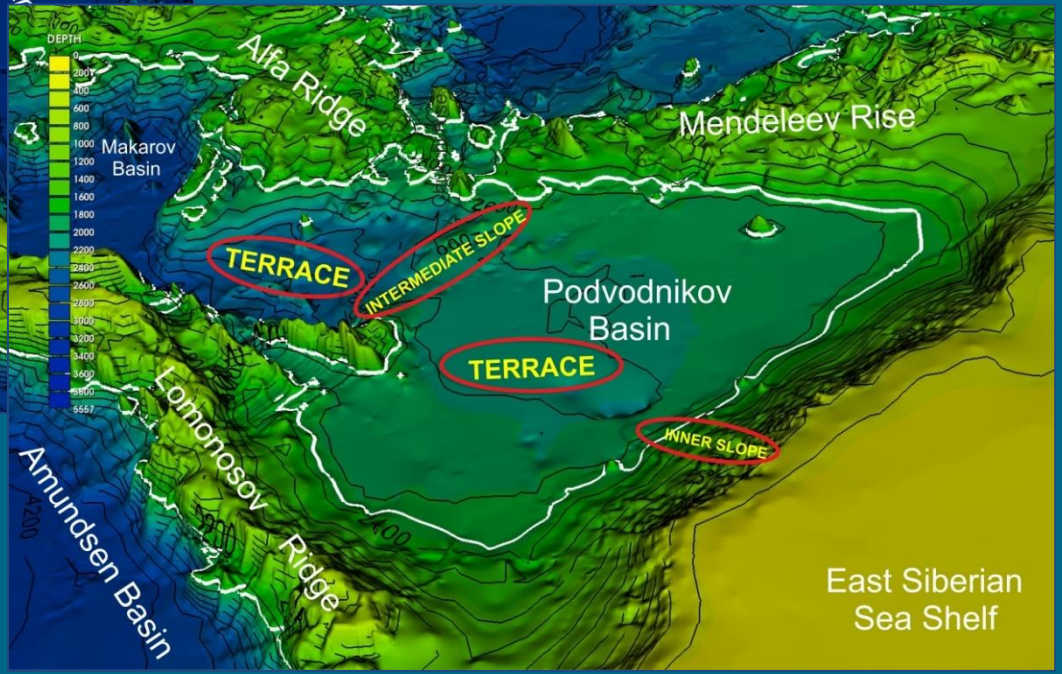
Bathymetric profile across the slope along seismic lines 1406 and 1403.



THE PODVODNIKOV BASIN AND THE EAST SIBERIAN SHELF

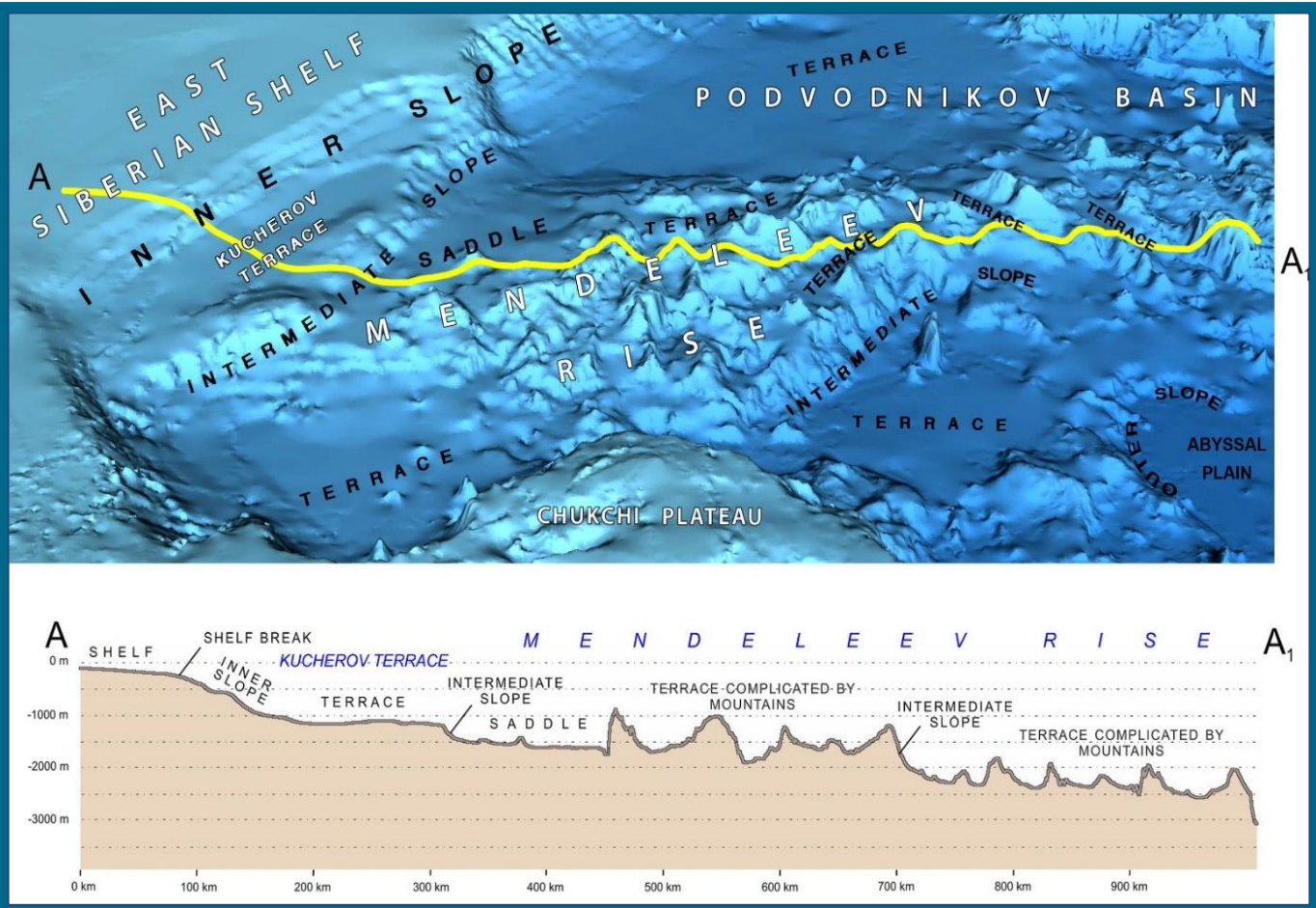


Bathymetric model IBCAO 3.0 (interpreted in Geocap) of the Podvodnikov Basin.



The Podvodnikov Basin is a large bathymetric depression which is composed from two terraces dividing a total slope into three parts: inner, intermediate and outer slopes.

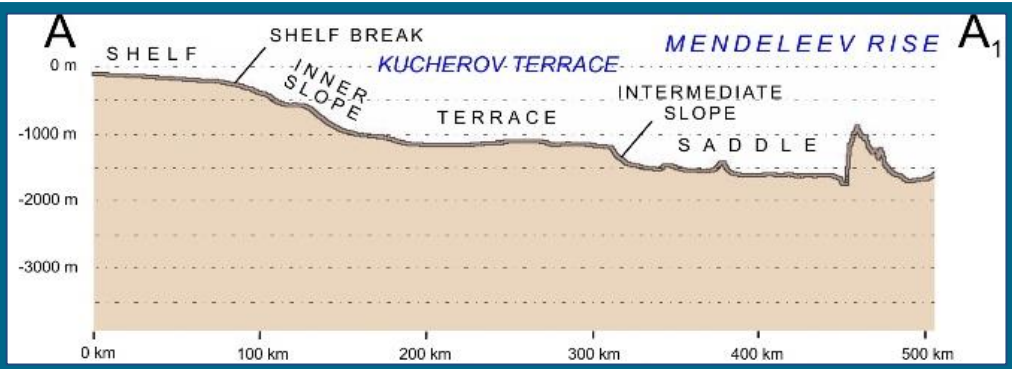
THE MENDELEEV RISE AND THE EAST SIBERIAN-CHUKCHI SHELF

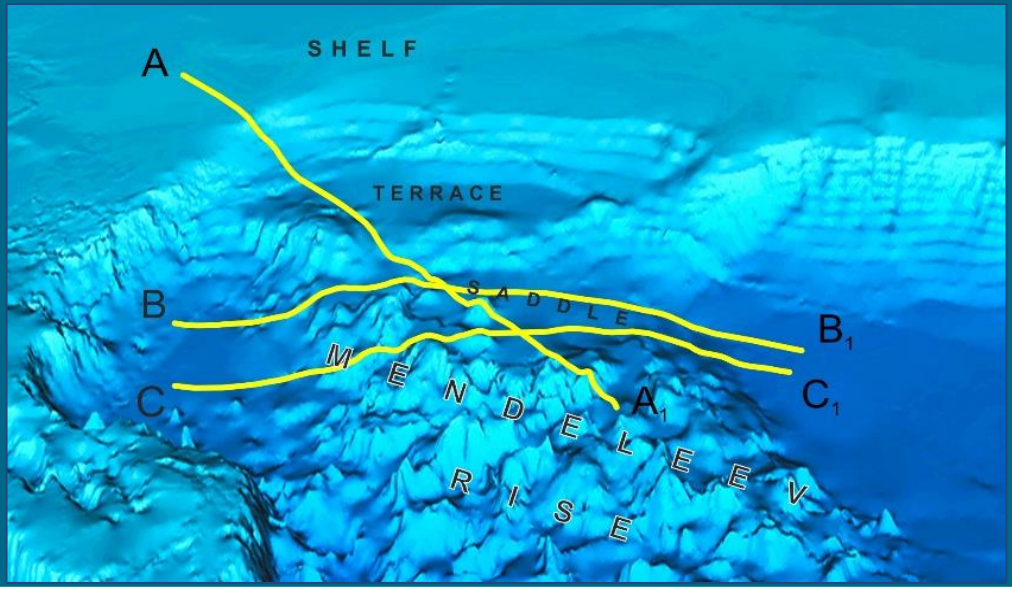


The Mendeleev Rise with the adjacent shelf are presented by inner slope, the Kucherov terrace, intermediate slope and deep-water saddle located below.

Profile A-A1 (seismic line 1201) shows that the uplift has step-like structure and consists of a terraces system complicated by hills and mountains.

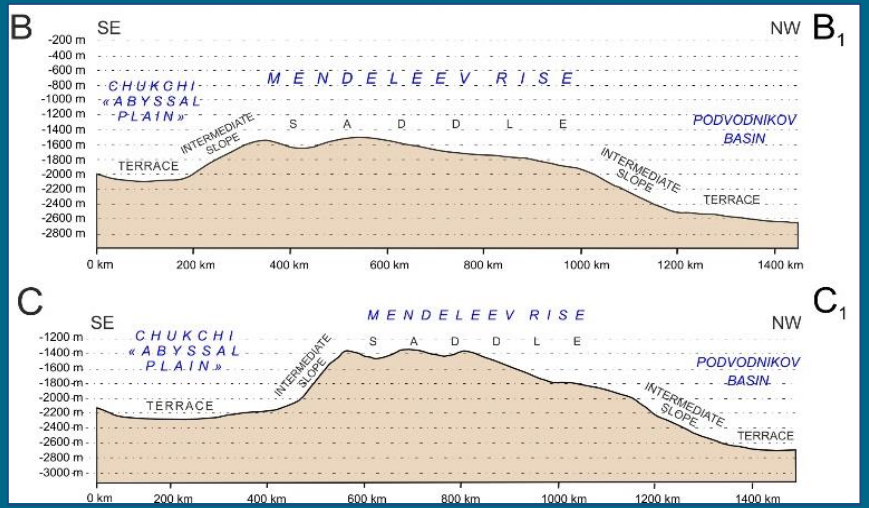
THE MENDELEEV RISE AND THE EAST SIBERIAN-CHUKCHI SHELF



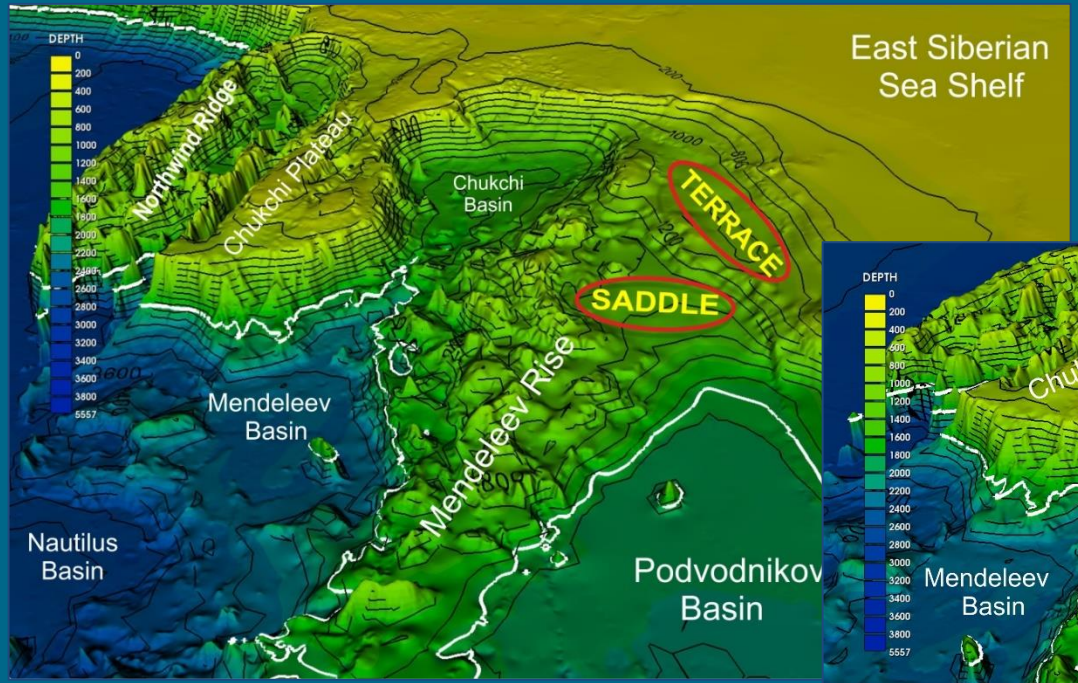


The junction of the Mendeleev Rise and the Shelf is presented by an inner slope, the Kucherov Terrace (1000-1200 m) and by a saddle below the Terrace (1400-1800 m).

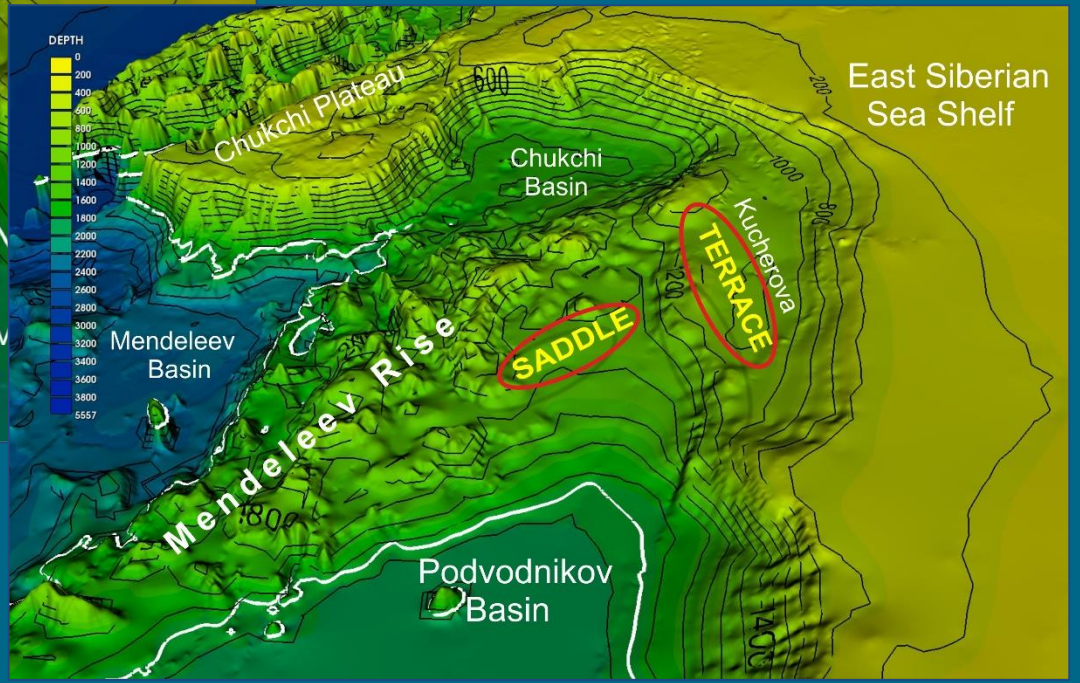
Mendeleev Rise is not separated from the continental margin. It is a complex continental slope.



THE MENDELEEV RISE AND THE EAST SIBERIAN-CHUKCHI SHELF

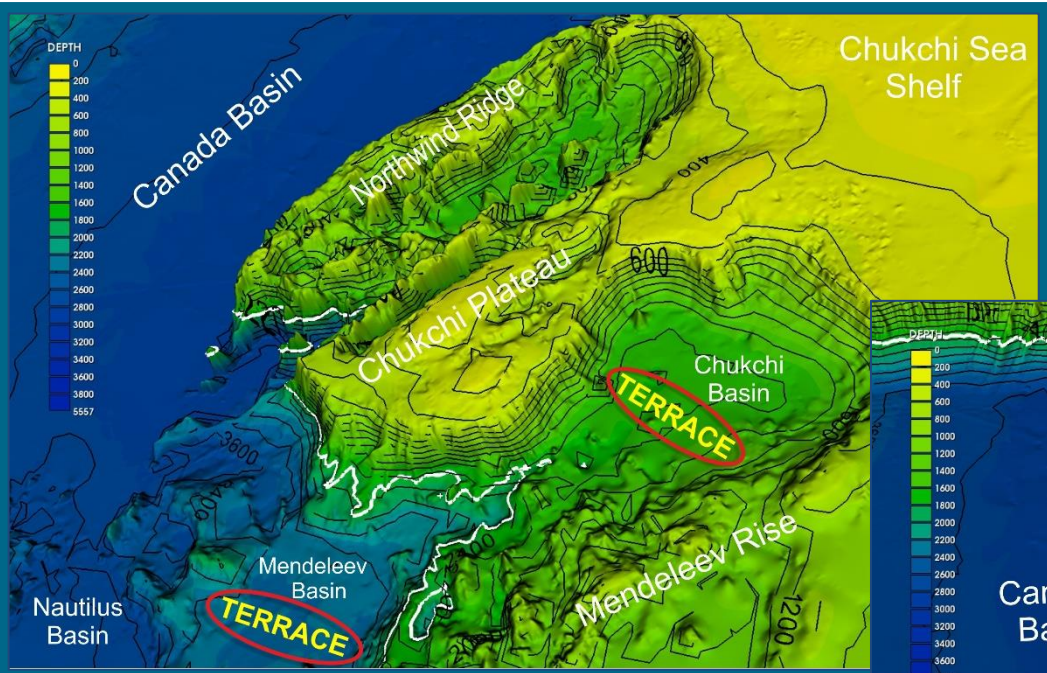


Bathymetric model IBCAO 3.0 (interpreted in Geocap) of the Mendeleev Rise.

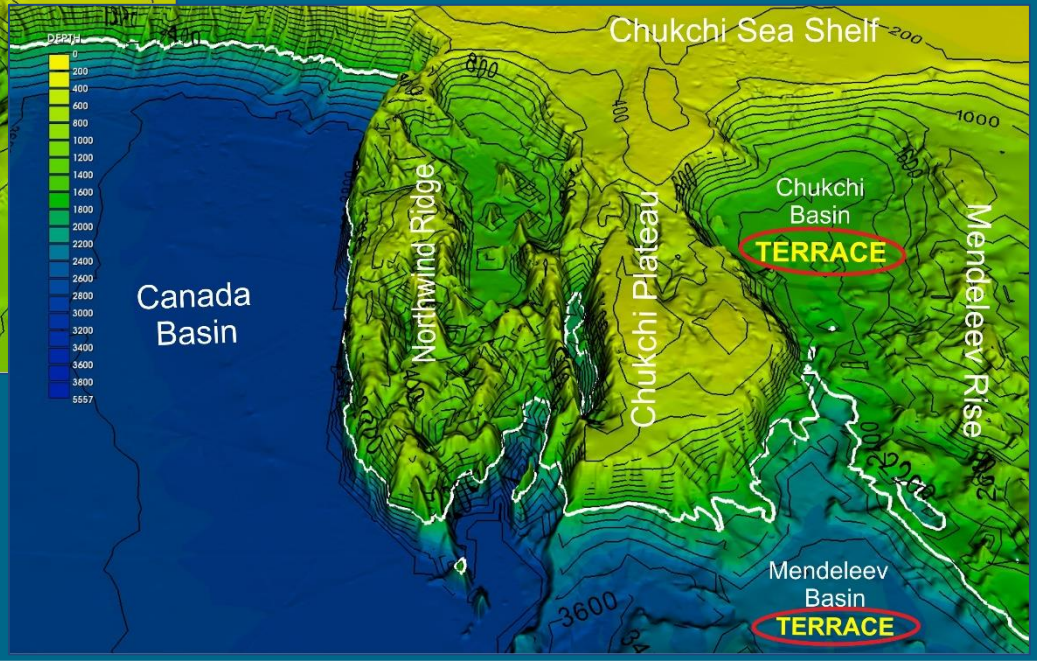


Along the strike the Mendeleev Rise is represented by a series of terraces complicated by isolated low-amplitude rises with the height about 1.5 km below sea level.

THE CHUKCHI PLATEAU AND THE CHUKCHI SHELF



Bathymetric model IBCAO 3.0 (interpreted in Geocap) of the Chukchi Basin and the Chukchi Plateau.



The Chukchi Basin and the Chukchi Plateau are parts of the Chukchi continental margin. They form a complex continental slope.

CONCLUSIONS

- Two types of slope along the Eurasian continental margin in the Arctic Ocean are indicated: simple slope and complex slope.
- A simple slope stretches along the Barents, Kara and Laptev Shelves without significant complication of topographic forms.
- A complex slope stretches along the East Siberian and Chukchi Shelves with significant complication of topographic forms as series of terraces, saddles, plateaus, hollows, highs and etc.
- The Lomonosov Ridge, Podvodnikov Basin, Mendeleev Rise, Chukchi Basin and Chukchi Plateau morphologically belong to the continental margin. They are characterized by a “dismembered” slope.
- The Lomonosov Ridge and Mendeleev Rise are submarine elevations that are natural morphological components of the continental margin.


THANK YOU!