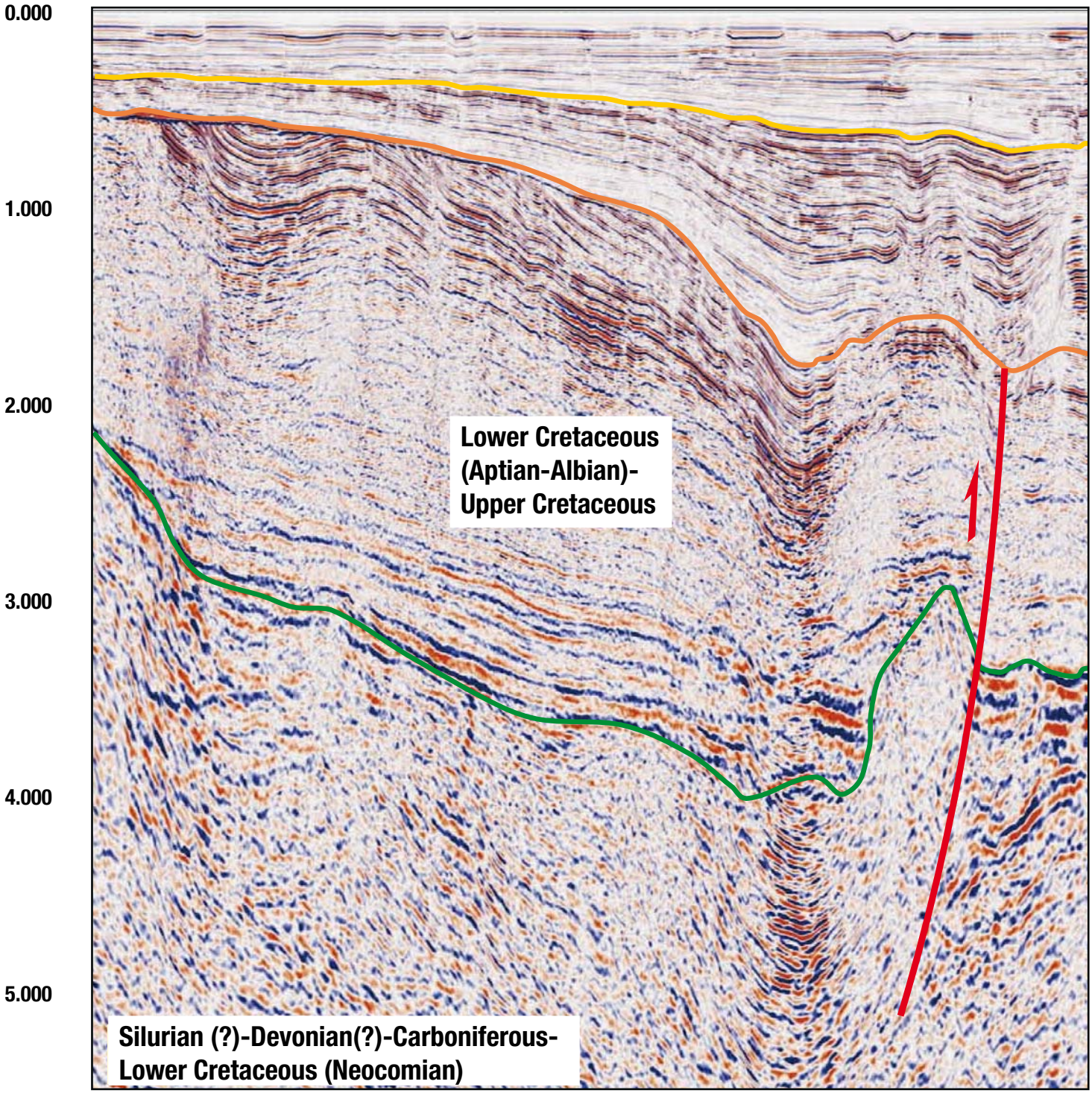
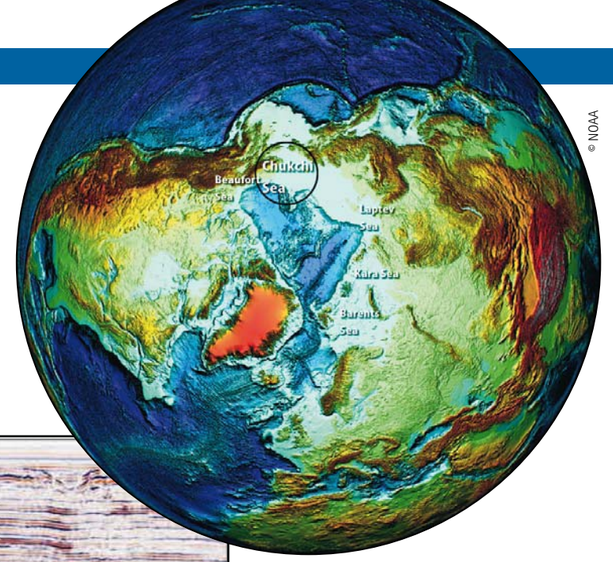
The Russian Chukchi Sea

In 2006, TGS-NOPEC Geophysical Company acquired 3600km of multi-client 2D seismic in the Russian Chukchi Sea in cooperation with Geophysical Solutions Integrator. The Chukchi Sea has an average water depth of 77m and comprises some 600,000 km^2 when including the American part. The sea is navigable between July and October both eastward and westward from the shallow Bering Strait.



Buried Northern termination of Wrangel Arch

With little seismic data, and no wells, the assessment of the Russian Chukchi Sea depends largely on field work and outcrop studies on the Chukotka Peninsula on the northeastern shore of Siberia and the Wrangel Island in the Chukchi Sea. Here we see carbonates with minor clastic of Carboniferous age. Wrangel Island, Tsentran'nye Mountains, Khishchnikov head river.



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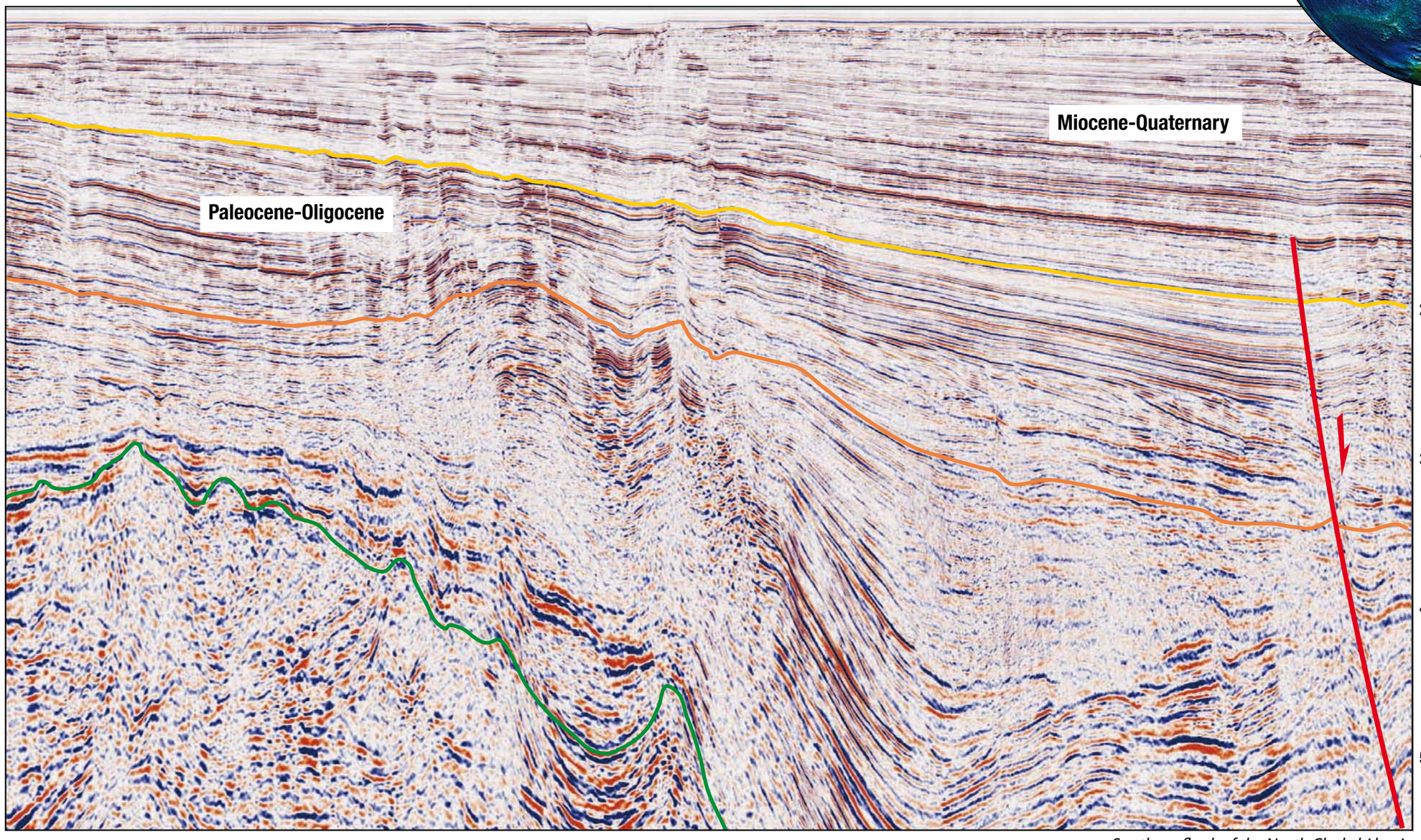
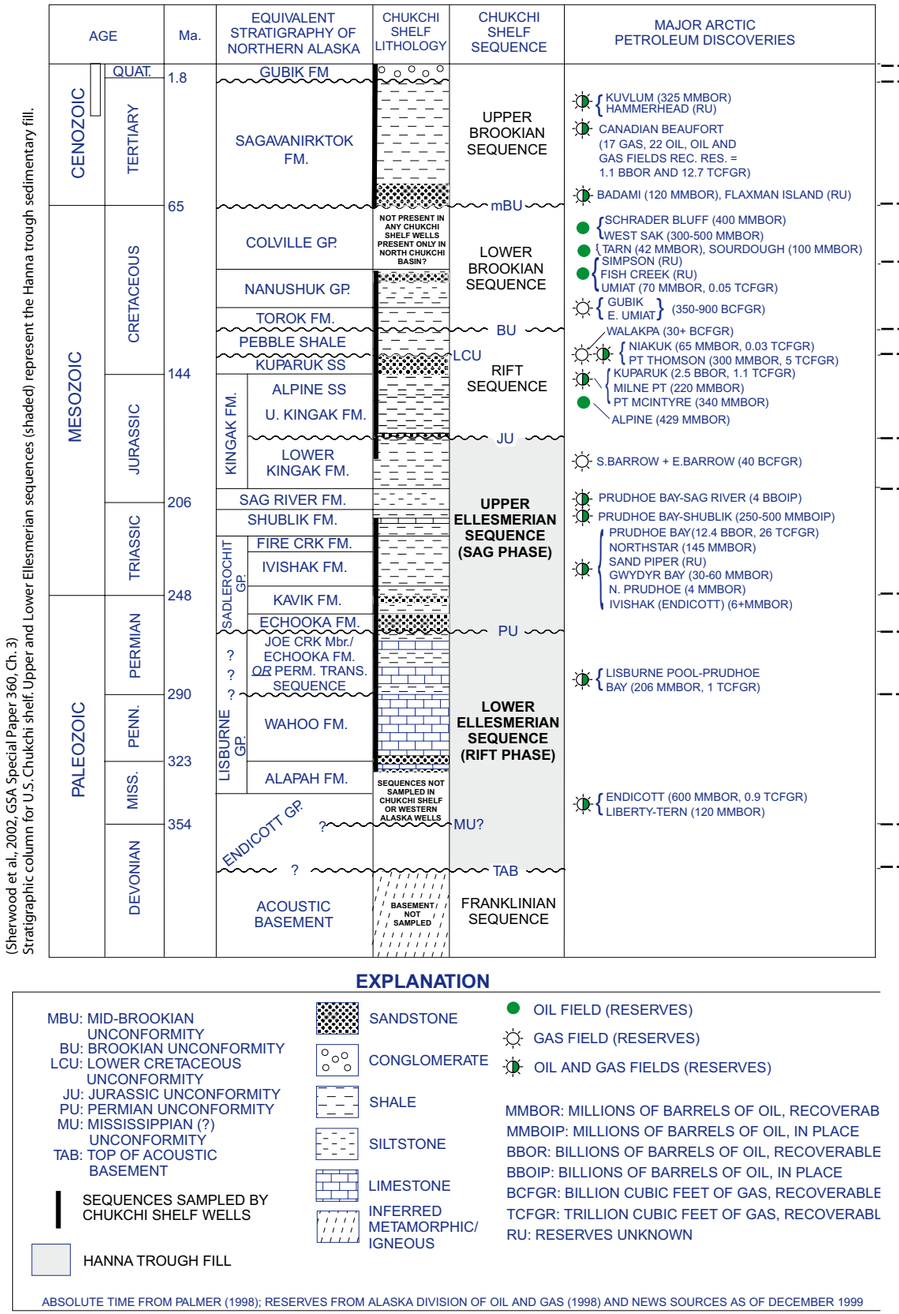
The Chukchi Sea belongs to the Arctic Ocean and is bounded to the west by the Wrangel Island and East Siberian Sea, to the south by northeastern Siberia and northwestern Alaska, to the east by the Beaufort Sea, and to north by the Arctic continental slope. The Chukchi Sea sedimentary basins all lie on the North American plate.



Southern flank of the North Chukchi basin

U.S. Chukchi shelf stratigraphic column



(Sherwood et al., 2002, GSA Special Paper 360, Ch. 3)
Stratigraphic column for U.S. Chukchi shelf. Upper and Lower Ellesmerian sequences (shaded) represent the Hanna trough sedimentary fill.

EXPLANATION

MBU: MID-BROOKIAN UNCONFORMITY
BU: BROOKIAN UNCONFORMITY
LCU: LOWER CRETACEOUS UNCONFORMITY
JU: JURASSIC UNCONFORMITY
PU: PERMIAN UNCONFORMITY
MU: MISSISSIPPIAN (?) UNCONFORMITY
TAB: TOP OF ACOUSTIC BASEMENT

SEQUENCES SAMPLED BY CHUKCHI SHELF WELLS

HANNA TROUGH FILL

SANDSTONE
CONGLOMERATE
SHALE
SILTSTONE
LIMESTONE
INFERRED METAMORPHIC/ IGNEOUS

OIL FIELD (RESERVES)
GAS FIELD (RESERVES)
OIL AND GAS FIELDS (RESERVES)

MMBOR: MILLIONS OF BARRELS OF OIL, RECOVERAB
MMBOIP: MILLIONS OF BARRELS OF OIL, IN PLACE
BBOR: BILLIONS OF BARRELS OF OIL, RECOVERABLE
BBOIP: BILLIONS OF BARRELS OF OIL, IN PLACE
BCFGR: BILLION CUBIC FEET OF GAS, RECOVERABLE
TCFGR: TRILLION CUBIC FEET OF GAS, RECOVERABL
RU: RESERVES UNKNOWN

ABSOLUTE TIME FROM PALMER (1998); RESERVES FROM ALASKA DIVISION OF OIL AND GAS (1998) AND NEWS SOURCES AS OF DECEMBER 1999

Russian Northern Chukchi shelf inferred stratigraphic column

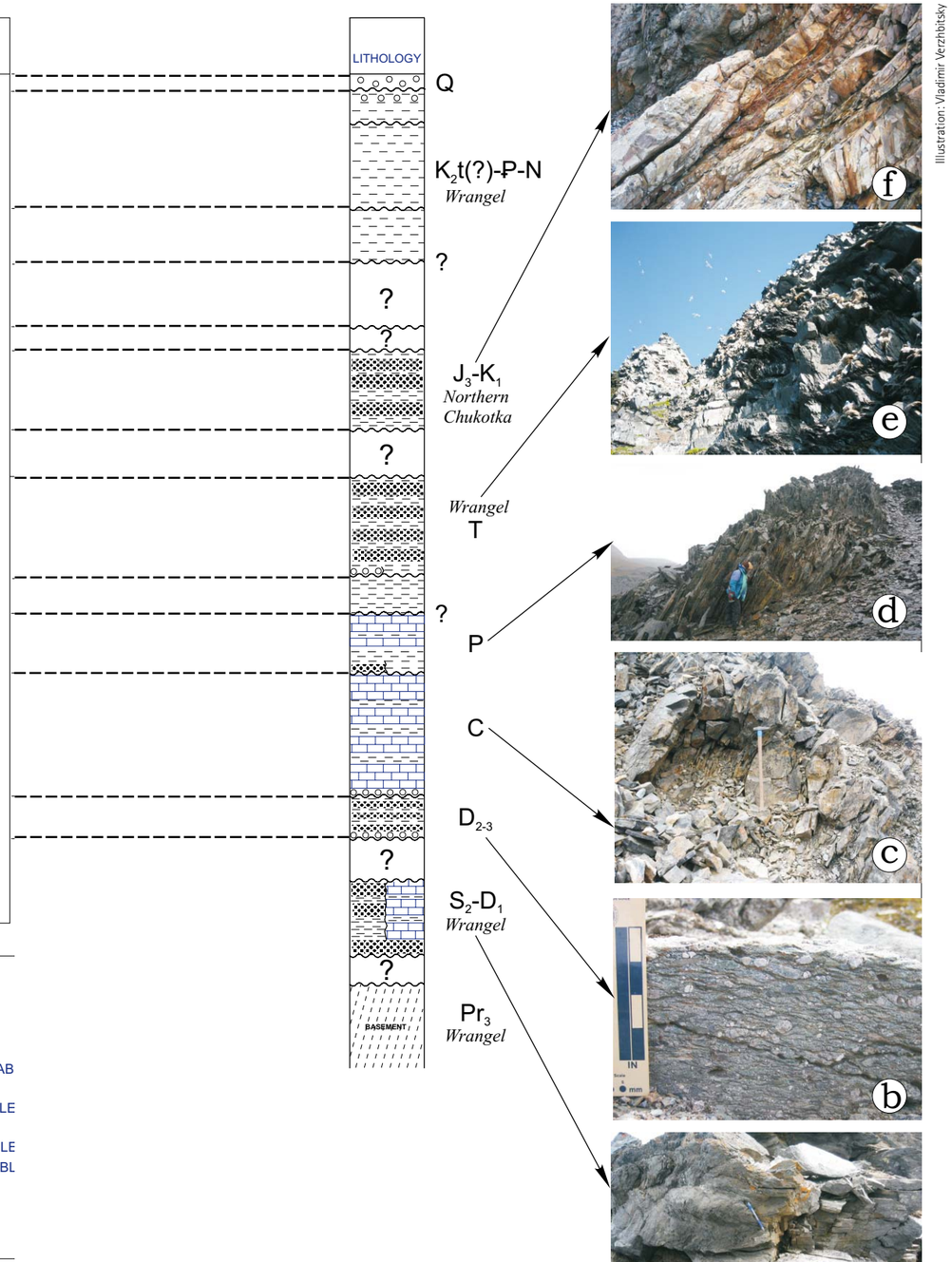


Illustration: Vladimir Verzhbitsky

The Russian Chukchi Sea shelf

The Russian sector of the Chukchi Sea is a frontier exploration province, with little seismic data and no wells. Despite this lack of crucial geological information, regional correlations with the American sector indicate that the potential of this vast region may be substantial.

V.Verzhbitsky[1], E.Frantzen[2], T.Savostina[1], A.Little[3], S.D.Sokolov[4], M.I.Tuchkova[4]

Recent studies of the East Siberian and Chukchi Seas conclude that the estimated total recoverable resources of this frontier area may be close to 100 billion barrels of oil equivalents. The estimate is based on geological and geophysical data as well as regional geological correlations with Arctic Alaska.

During the summer of 2006, TGS-NOPEC Geophysical Company, in cooperation with Geophysical Solutions Integrator acquired new seismic data in the Russian part of the Chukchi Sea.

Due to the absence of offshore wells in the Russian sector, the interpretation of this data and evaluation of the hydrocarbon potential has been based on field studies on *Chukotka Peninsula* and *Wrangel Island*. In particular, the preliminary results of the international Russian-Swedish-American geological expedition to these islands in 2006 are important.

In addition, extensive use has been made of correlations with the American sector of the Chukchi Sea and the Alaskan North Slope.

Many giant discoveries have been made in the US Arctic Alaska and Chukchi shelf (e.g. Prudhoe Bay, Kuparuk, Burger), whereas the Russian part is still poorly explored by present-day geological and geophysical methods. Nevertheless, the widely observed similarities in tectonic history and depositional settings of both sectors point to the significant hydrocarbon potential of the Russian Chukchi shelf.

The studied area of the Chukchi Sea includes several regional tectonic subdivisions (from south to north): the New-Siberian-Chukotka fold belt area, South-Chukchi Basin, the Wrangel (Wrangel-Herald) Arch, and the North-Chukchi Basin.

You will find the full article on the Chukchi Sea geology here: www.geoexpro.com/TGS-Chukchi.

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US Chukchi Sea

In GEO ExPro No. 2, 2007 (page 60-61), we gave a summary of the development in the American sector of the Chukchi Sea based on the recent, successful lease sale which proved that some of the major oil companies believe in the oil potential of this basin. Unlike the Russian sector, several wells have been drilled and discoveries been made in the American part of this huge basin.

Main tectonic elements
The blue colour corresponds to the simplified distribution of negative free air gravity anomalies. The seismic profiles (dark-blue thin lines) have been acquired by TGS-NOPEC in cooperation with Geophysical Solutions Integrator.

Permian slates (black shales). Wrangel Island, Tsentran'nye Mountains, Khishchnikov head river.