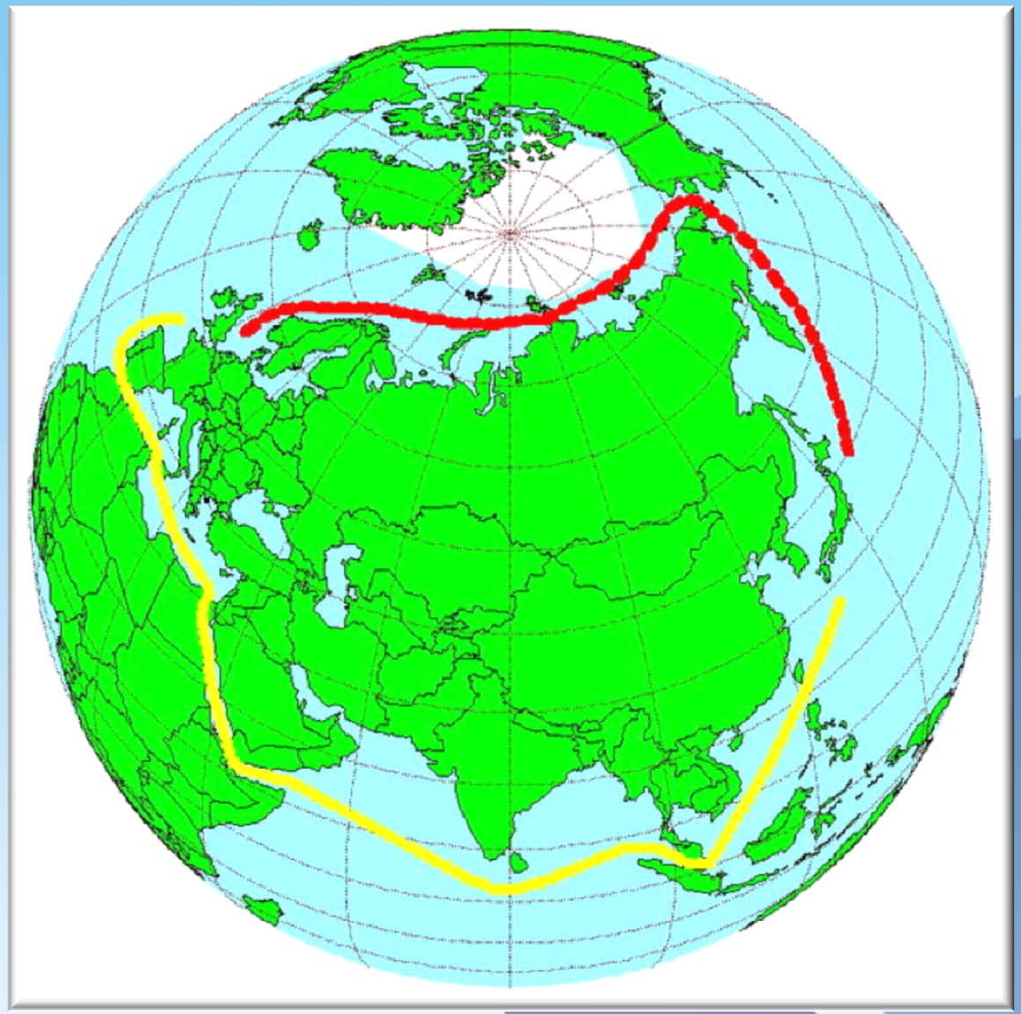
ROSATOMFLOT



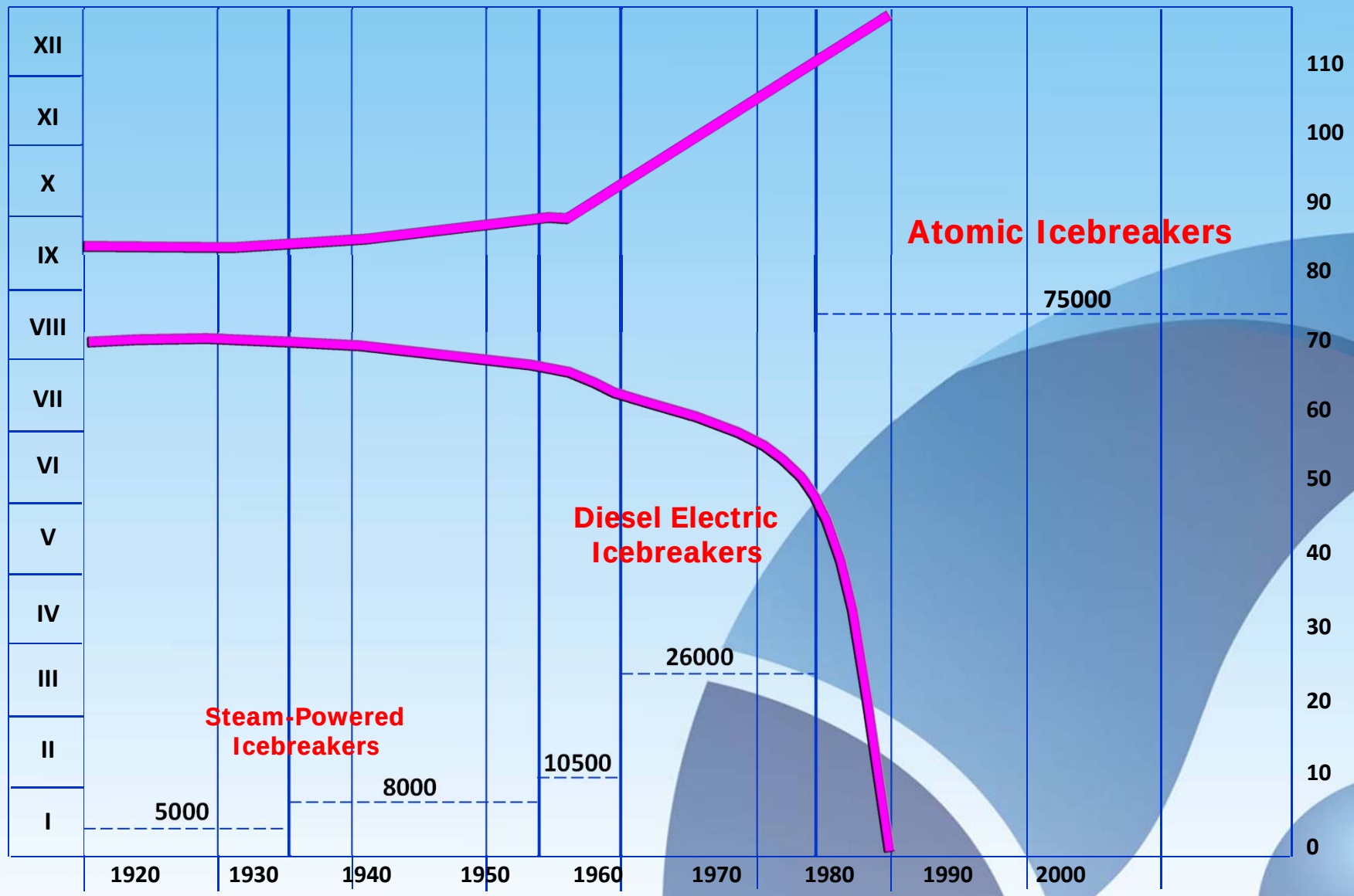
The Navigation on the Northern Sea Route Today & in the Future

Atomic Icebreaking Fleet of Russia

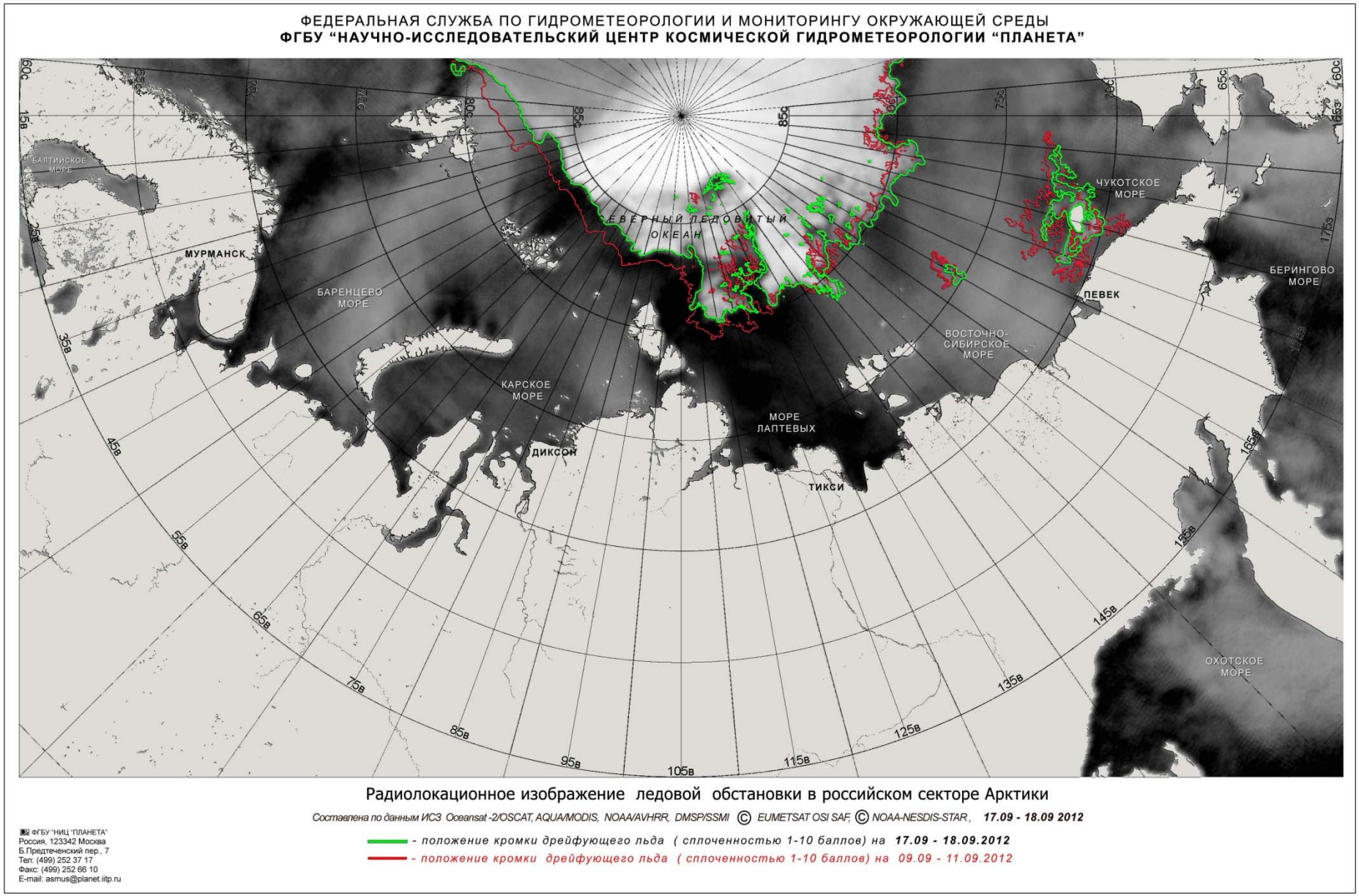
Atomic icebreakers of “Arktika” type:
Propulsion Capacity – 54 MW;
Water displacement – 23000 t;
i/b “Rossia” – **21.12.1985**
i/b “Sovetsky Soyuz” – **29.12.1989**
i/b “Yamal” – **28.10.1992**
i/b “50 Let Pobedy” – **23.03.2007**

Atomic Icebreakers of “Taimyr” type:
Propulsion Capacity – 35 MW;
Water displacement 21000 t;
i/b “Taimyr” – **30.06.1989**
i/b “Yaygach” – **25.07.1990**

Increase in navigation period in the western area of Russian Arctic in 1920-2009 related to rise of icebreaking capacity



Satellite Image of Ice Conditions in the Russian sector of Arctic dd. 18.09.2012



The Gulf of Finland

2011

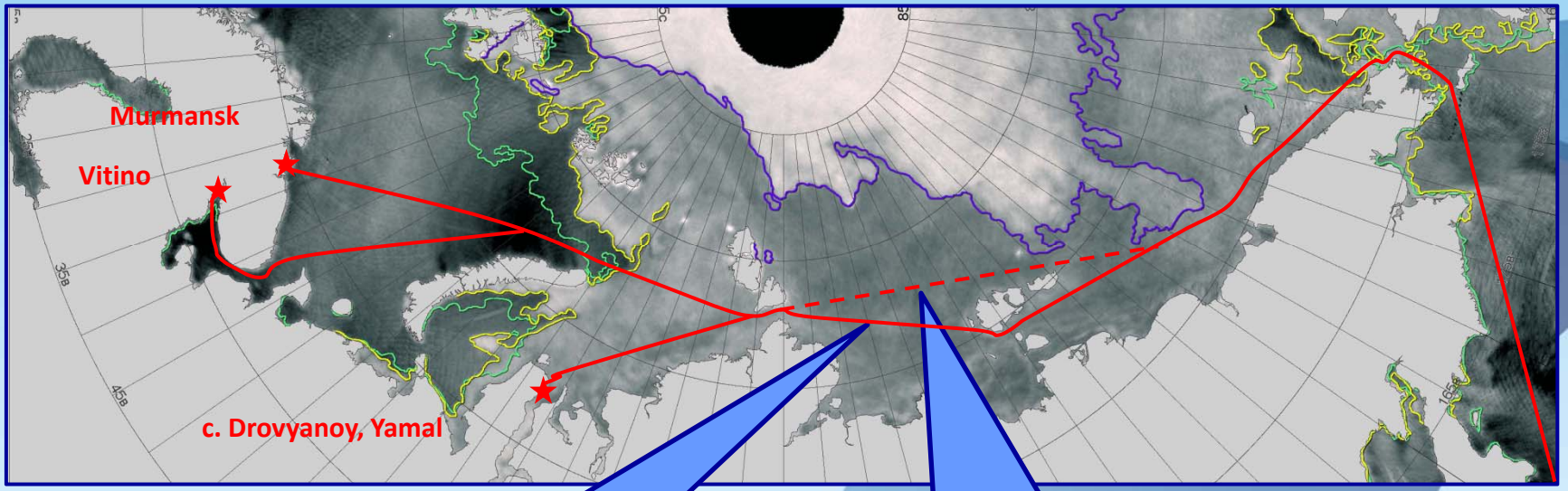
i/b Vaygach
Freight period: 19.02 – 16.04.2011
Total vessels piloted: 258

2012

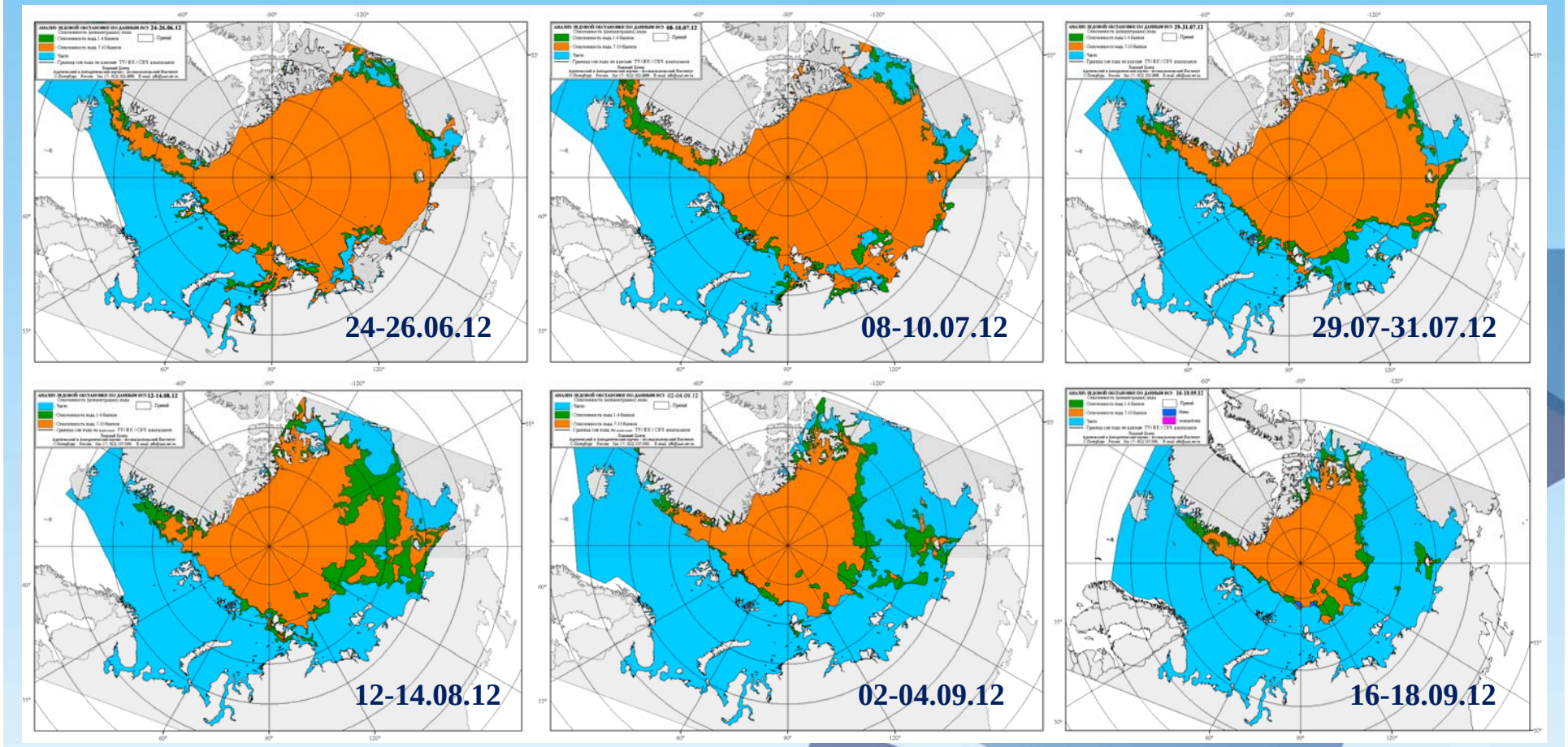
i/b 50 Let Pobedy 27.01 – 09.03.2012
i/b Rossiya 09.03 – 18.04.2012

White Sea
(Vitino Port Operations)

NRS routes
16.08.2010



Ice Conditions by Periods:



	Ice Concentration 1-6 points		Ice Concentration 7-10 points
	Extra Young Ice		Fast Ice
	Young Ice (0-30 cm)		Clear
	One-Year Ice (30-200 cm)		
	Ice Area Border according to TV/IR/microwave		

Northern Sea Route is the highway to European and Asian markets

Oil and Gas from Murmansk

State	through Suez Canal		through NSR		+/- days
Japan (p. Kobe)	12291 miles	37,1 days	6010 miles	18,1 days	-19
Korea (p. Busan)	12266 miles	37 days	6097 miles	18,4 days	-18,6
China (p. Ningbo)	11848 miles	35,8 days	6577 miles	19,9 days	-15,9

From Rotterdam to the Asian markets

State	through Suez Canal		through NSR		+/- days
Japan (p. Kobe)	10969 miles	33,1 days	7610 miles	23 days	- 10,1
Korea (p. Busan)	10754 miles	32,5 days	7697 miles	23,2 days	- 9,3
China (p. Ningbo)	10336 miles	31,2 days	8177 miles	24,7 days	- 6,5

Transit Voyages 2010

SCF Baltica:
NSR period: 16.08 – 27.08.2010 (10,5 days)
Tanker deadweight:117000 tons
Cargo: 70000 tons of gas condensate

Nordic Barents:
NSR period: 8 days
Bulker deadweight:43372 tons
Cargo: 41000 tons of iron concentrate

4 transit voyages were done in 2010
Total amount of transit cargo: 111 000 tons
In ballast: 2 voyages

Transit Voyages 2010

The voyage by Swedish supply icebreaker Tor Viking II piloted by atomic icebreaker Rossiya was done a month after the official completion of summer-to-autumn navigation on the NSR. This successful transit voyage done in late December proved that it is possible to increase the period of Arctic navigation on the NSR in winter months.

Pilotage of mt Perseverance on the NSR

<u>Eastbound Voyage:</u>
Tanker deadweight: 75000 tons
Cargo: 61000 tons gas condensate
NSR navigation period: 30.06 – 15.07.2011 (14,9 days)
Average speed: 7,6 knots

<u>Return Voyage:</u>
Tanker deadweight: 75000 tons
Cargo: 64000 tons jet fuel
NSR navigation period: 09.09 – 16.09.2011 (8 days)
Average speed: 13,7 knots

Pilotage of mt STI Heritage on the NSR

Tanker deadweight: 75000 tons
Cargo: 61000 tons gas condensate of JSC NOVATEK
NSR navigation period: 21.07 – 29.07.2011 (8 days)
Average speed: 14,0 knots

Pilotage of mt Vladimir Tikhonov on the NSR

Tanker deadweight: 160 000 tons (Suezmax)
Cargo: 120 000 tons gas condensate of JSC NOVATEK
NSR navigation period: 23.08 – 30.08.2011
Average speed: 14,0 knots

Pilotage of mv Sanko Odyssey on the NSR

Bulker deadweight: 75 000 tons (Panamax)
Cargo: 66 500 tons of iron ore by JSC EUROCHEM
NSR navigation period: 03.09.2011 – 10.09.2011
Average speed: - 13,7 knots

Pilotage of Refrigerator Vessels on the NSR

Refrigerators with the cargo of red fish sail westbound along the Northern Sea Route.

NSR Caravan Piloting
July 2012

Mv Nordic Odyssey, mt Marilee, ttb Vengeri ice-piloted by ib Yamal and Vaygach July 12 – 22, 2012

NSR Transit Voyages in 2011

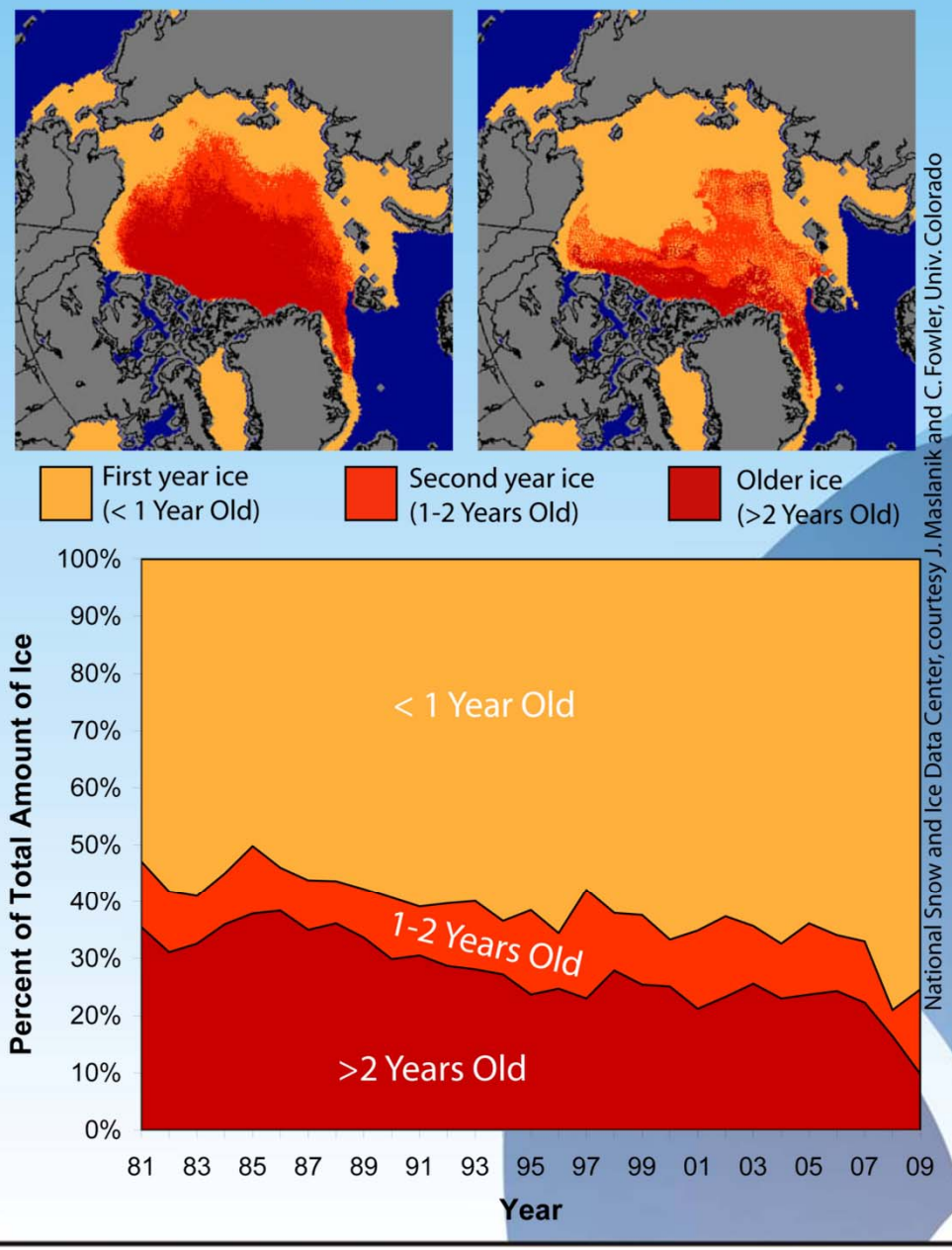
	Total Volume, t	Vessels Flags
Liquid Cargo	**682 170**	Singapore, Marshall Islands, Norway, Liberia, Finland
Bulk Cargo	**110 000**	Russia, Liberia
Frozen Fish	**27 535**	Russia, Panama
In Ballast	**10 Vessels**	Russia, Liberia, Panama

Total of Transit Voyages in 2010-2012

	2010	2011	2012*
Total Volume of Transit Cargo, t	**111 000**	**820 789**	**836 815**
Total Number of Transit Voyages	**4** (2 of them in ballast)	**34** (10 of them in ballast)	**31** (9 of them in ballast)

*** 2012 Transit Season number are actual for 27.09.2012**

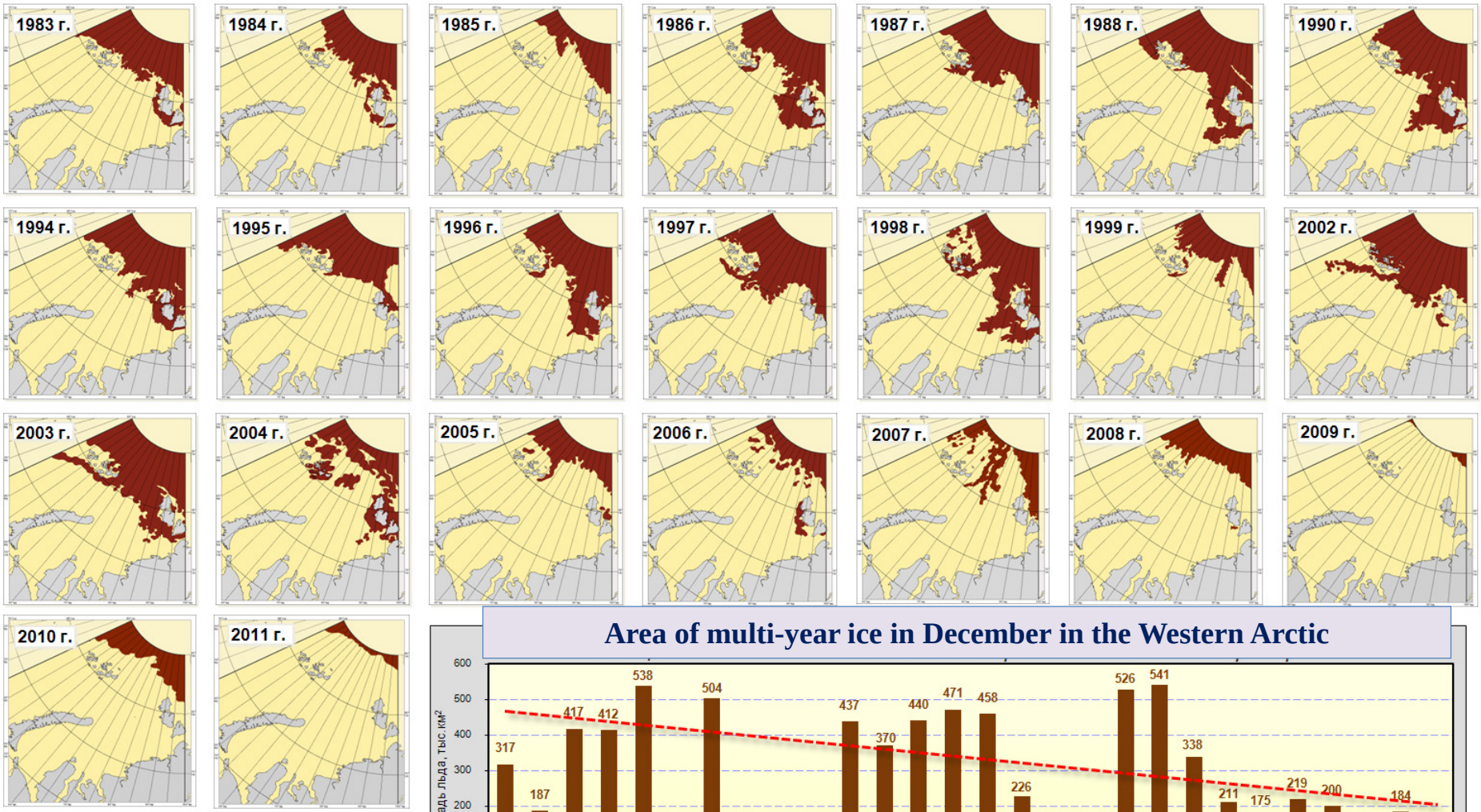
End of February Arctic Sea Ice Age



Federal Service for Hydrometeorology and Environment
Science and Research Centre for Space Hydrometeorology "Planet"

Change of Multi-Year Ice Area in the Western Arctic

December 1983 – December 2011



Area of multi-year ice in December in the Western Arctic

Universal Atomic Icebreaker

Principal Dimensions	Project 1052	Project 10580	Project 22220
Basic area of operations	Arctic	Yenisei River and shallow Arctic waters	Permanently – Western Arctic incl. Barents, Pechora and Kara Sea, shallow waters of the Yenisei River (up to port of Dudinka) and the Gulf of Ob. Eastern Arctic – in summer-autumn period
Length overall, m	148,0	150,0	173,3
Beam, m	30,0	29,2	34,0
Board height, m	17,2	15,2	15,2
Draught, m Minimal	11,00 -	8,1 -	10,5 8,55
Water displacement, t Minimal	23 460 -	19 600 -	33 530 25 540
Quantity and power of turbines, kW	2 * 27 580	2 * 18 400	2 * 33 500
Propulsion, hp	75 000	50 000	91 000
Ice-free water speed, knots	20,8	20,2	~ 22
Ice passability, m	2,25	1,95	2,8 – 2,9
Shaft power to water displacement	2,09	1,66	1,79
Crew quantity	107	91	75

Thank you for your attention!