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Implications of Mild Ice Seasons in the Baltic Sea for Operational Ice Services, Icebreking Activities and Maritime Transportation

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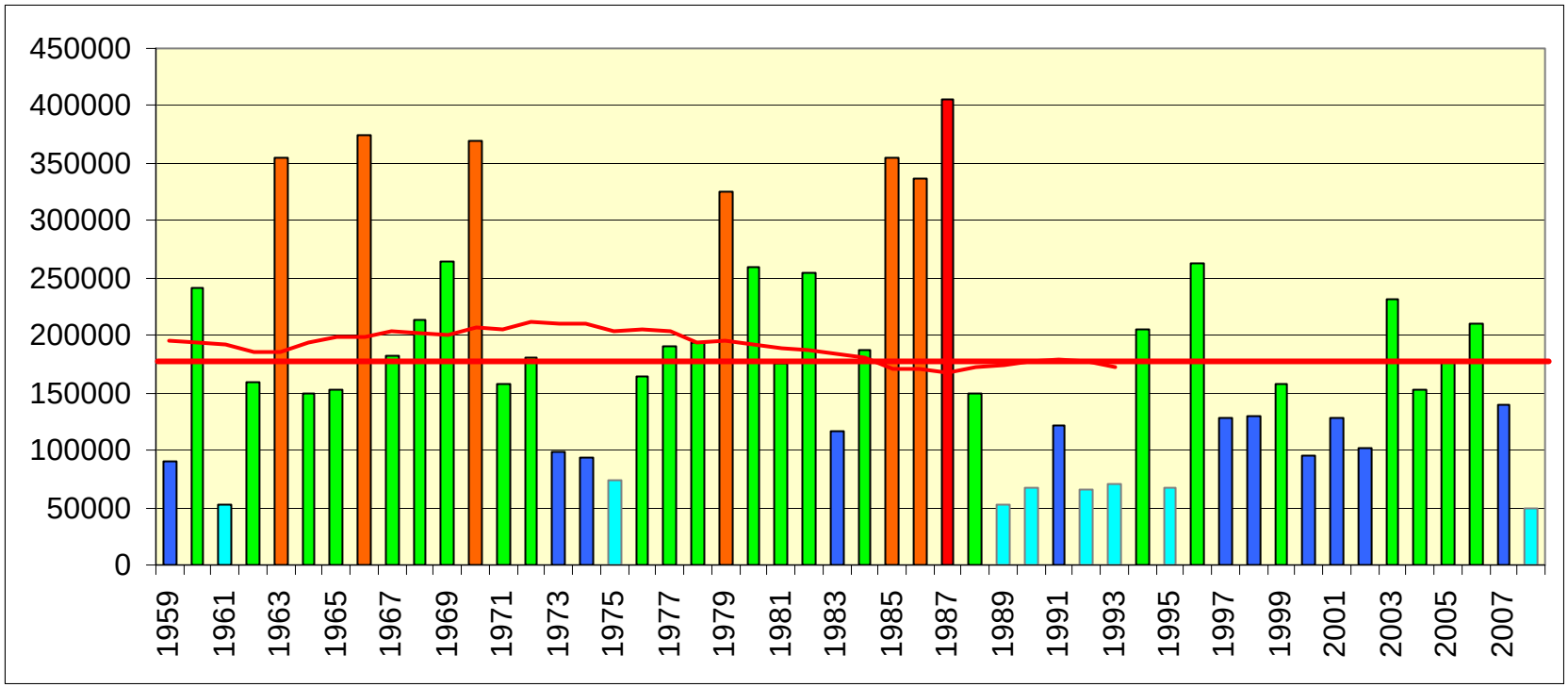
Winters with Reduced Snow and Sea Ice: propability of occurence and implications in the Baltic Sea catchement area.
BALTEX Workshop, January 12, 2009, FMI, Helsinki, Finland

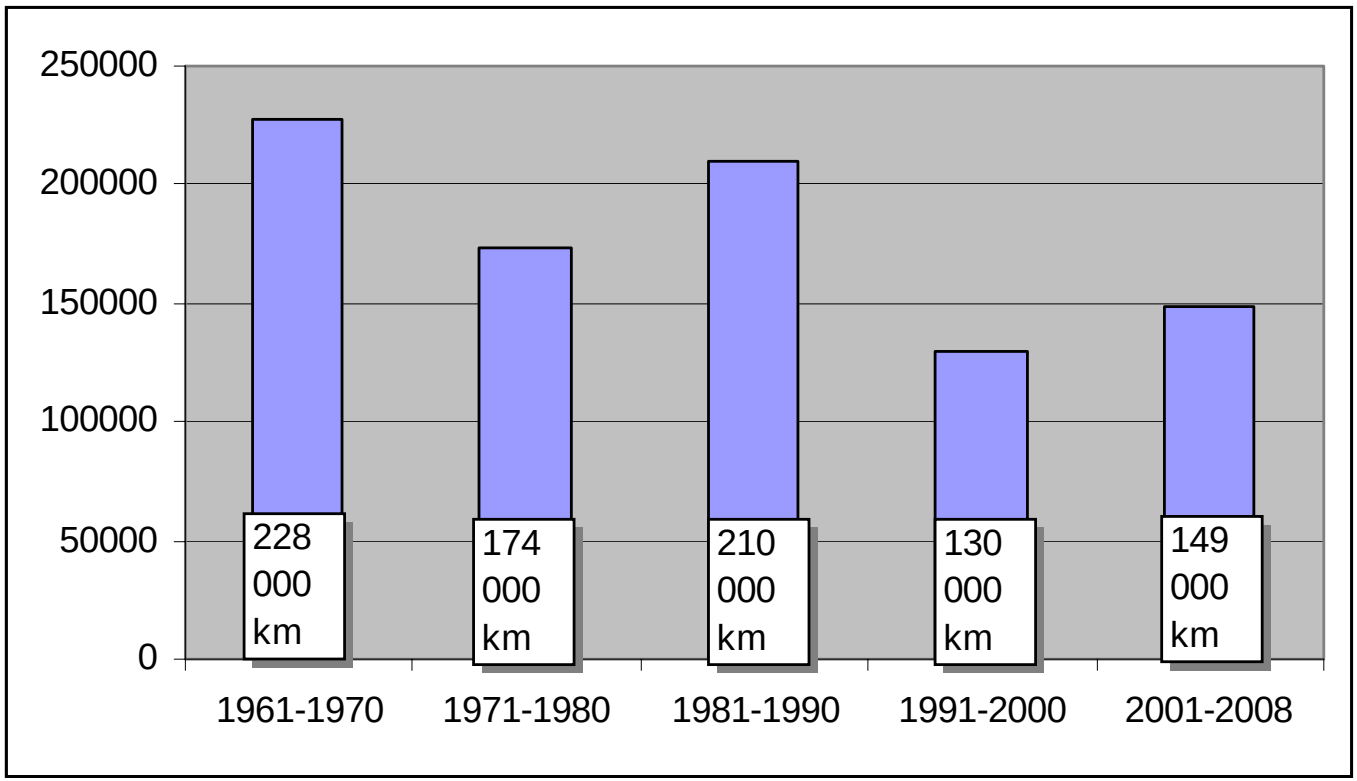
Ice seasons 1959-2008



Severity class	No of seasons
Extremely severe	1
Severe	6
Average	24
Mild	11
Extremely mild	8

Average 179 000 km²

Decade averages



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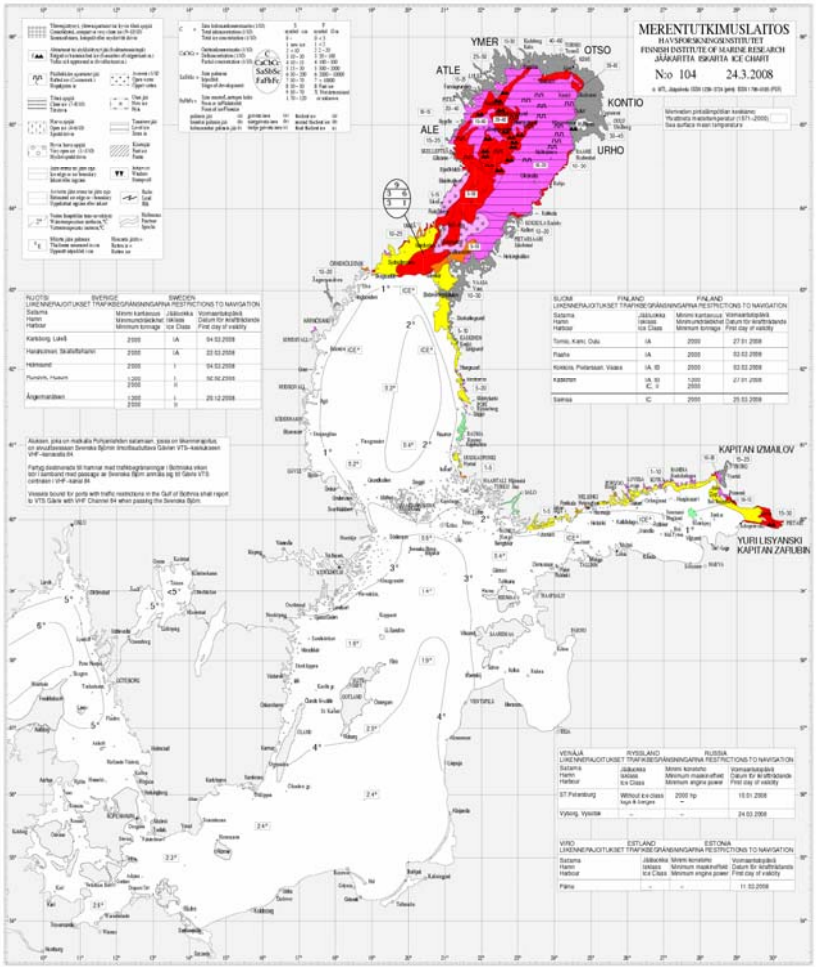
Baltic Sea Ice Season of 2007-08



- Mildest ever observed with max. of 49,000 sq.km since record started in 1720
- P= 0.03 (3 times in 1000 years)
- 52,000 sq. km in 1989, 53,000 sq. km in 1960, 58,000 sq. km in 1930, 61,000 sq. km in 1939

BUT in March 24, 2008 there were 9 icebreakers in operations: 3 Finn+3Swe+3 Rus

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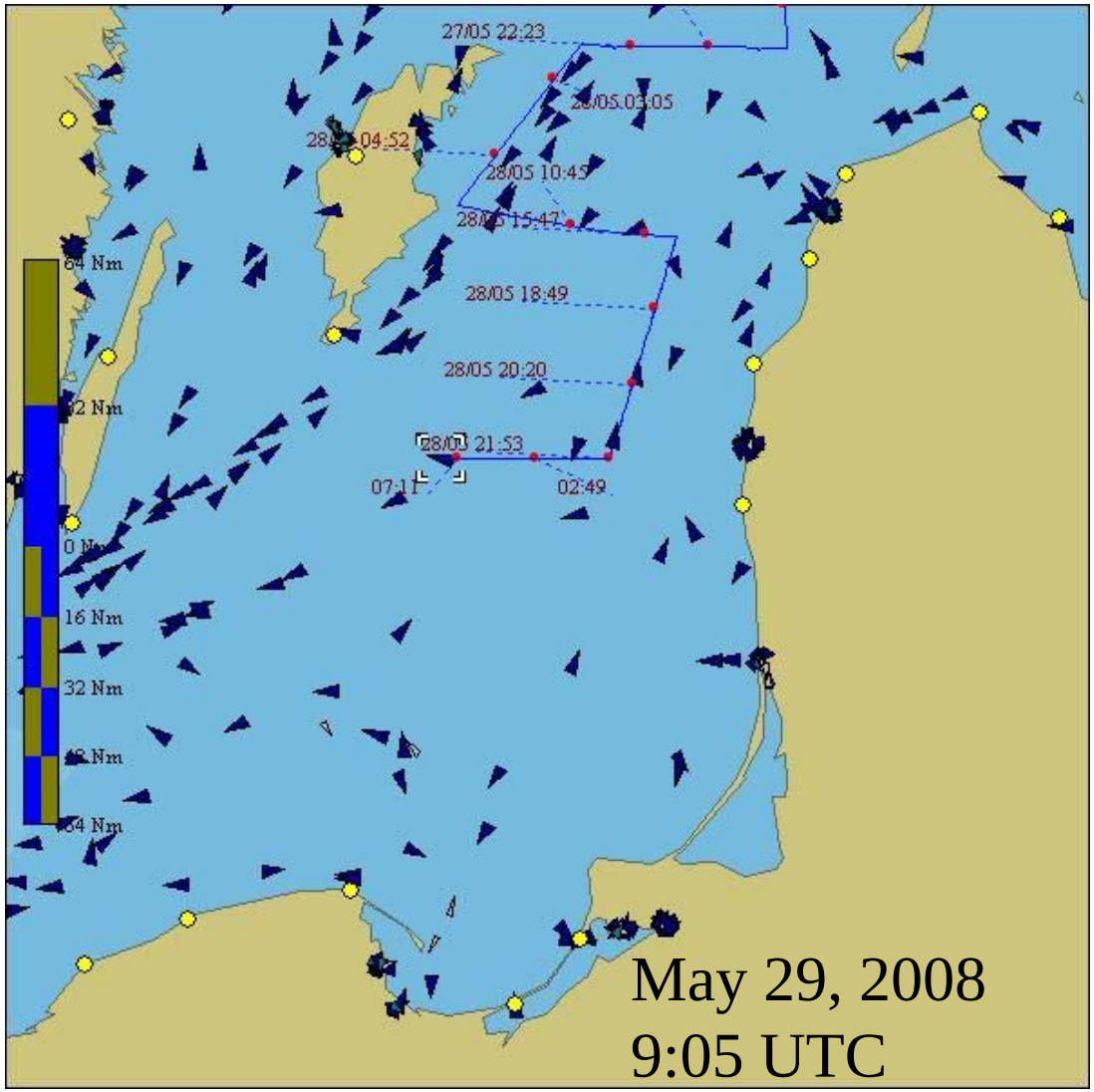
Challenges to Baltic Ice Services: Growth of maritime transportation



Baltic Sea

Effects the lives of 85 million people

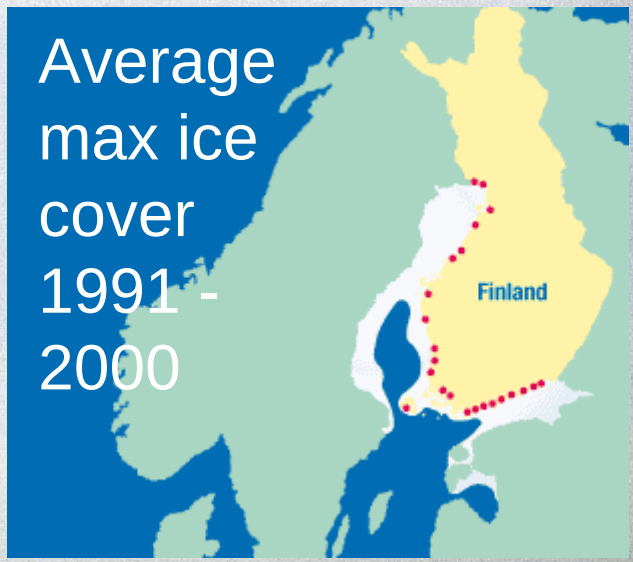
- **Annual ice cover**
- **Ice season up to 7 months**

Up to 90% of foreign trade is marine based

Ice navigation is obligatory

1800 large vessels are sailing at any given time

Finland 1994-2005 growth 34%



Avg. 130 000 km²

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The Baltic Sea has a heavy marine transportation

Baltic Sea seaborne transportation in 2003 and estimate in 2020 (in mil. Tonnes)

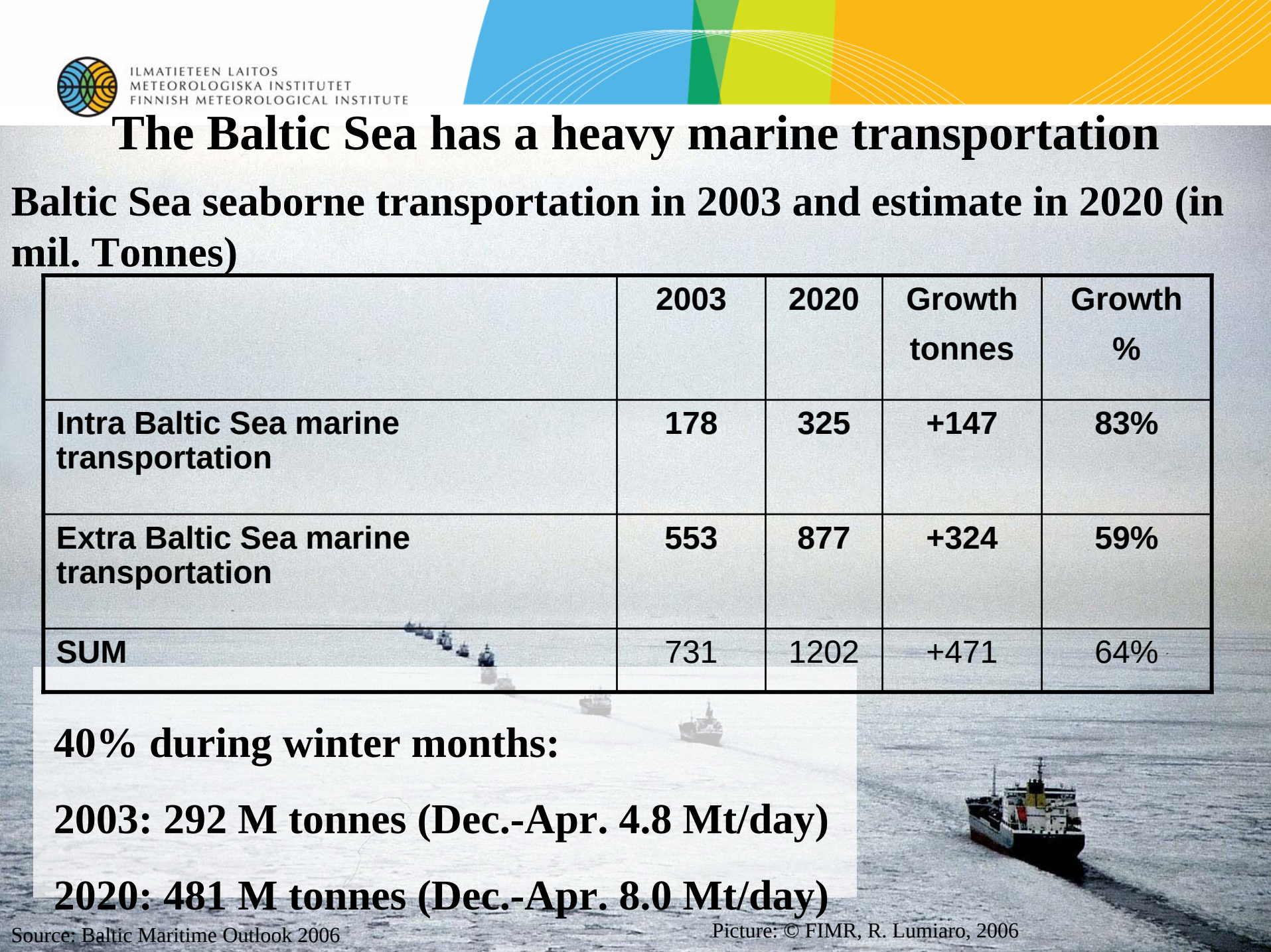
	2003	2020	Growth tonnes	Growth %
Intra Baltic Sea marine transportation	178	325	+147	83%
Extra Baltic Sea marine transportation	553	877	+324	59%
SUM	731	1202	+471	64%

40% during winter months:

2003: 292 M tonnes (Dec.-Apr. 4.8 Mt/day)

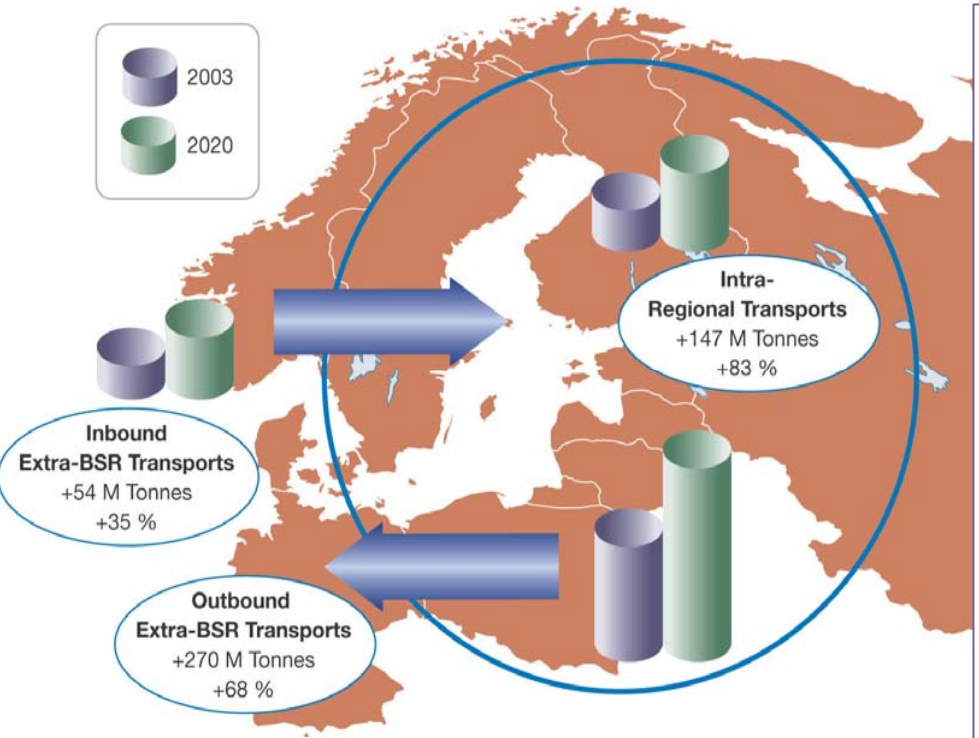
2020: 481 M tonnes (Dec.-Apr. 8.0 Mt/day)

Source: Baltic Maritime Outlook 2006



Picture: © FIMR, R. Lumiaro, 2006

Challenges to Baltic Ice Services: Growth of maritime transportation



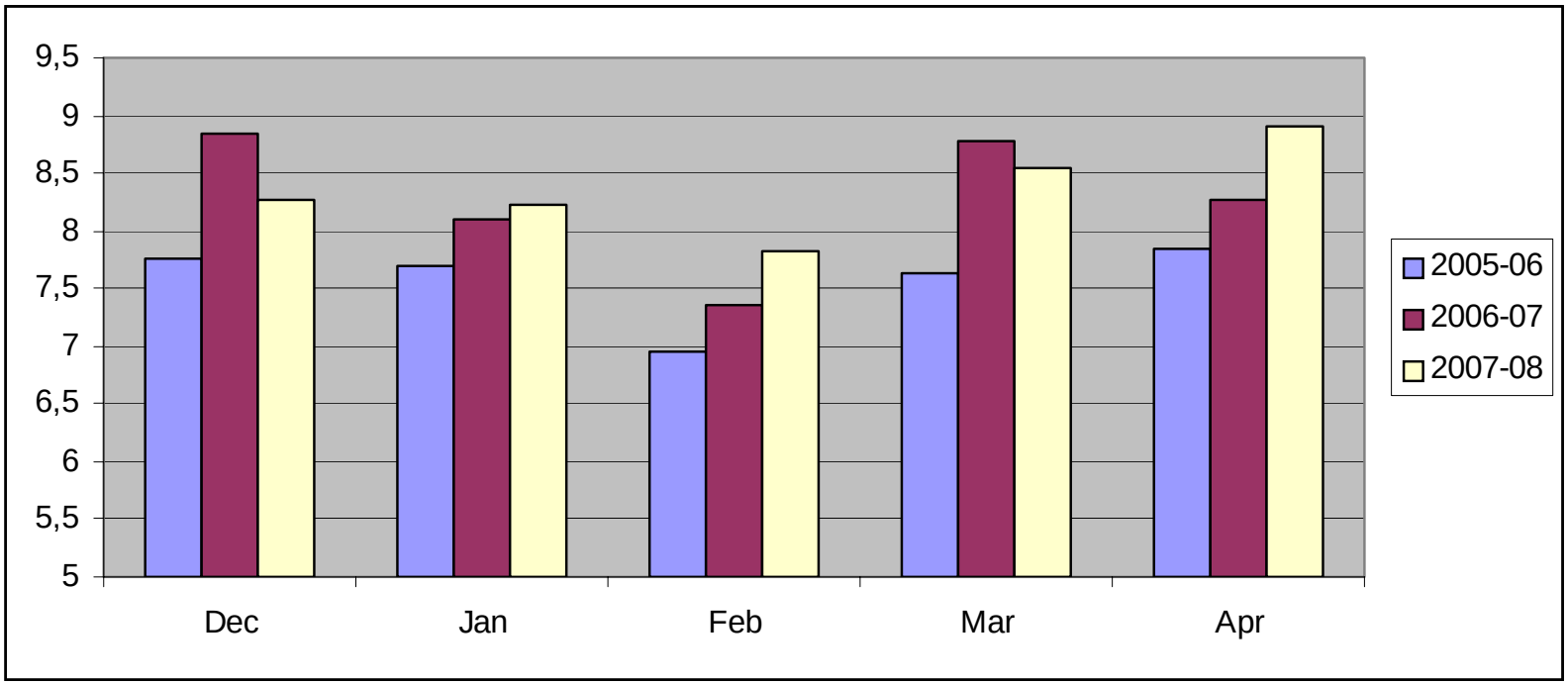
Future scenarios

- **Total maritime transport at Baltic Sea in 2003 was 731 Mt, in 2020 expected 1,202 Mt? (During winter months growth from 292 Mt to 481 Mt)**
- **Transport of German ports will grow from 294 Mt to 759 Mt between 2004 and 2025?**
- **8 B containers in Baltic Sea ports in 2010?**
- **Growth of 450% in Russian container traffic by 2015?**

Source: Baltic Maritime Outlook 2006

International maritime transportation in Finland

in mil. tonnes

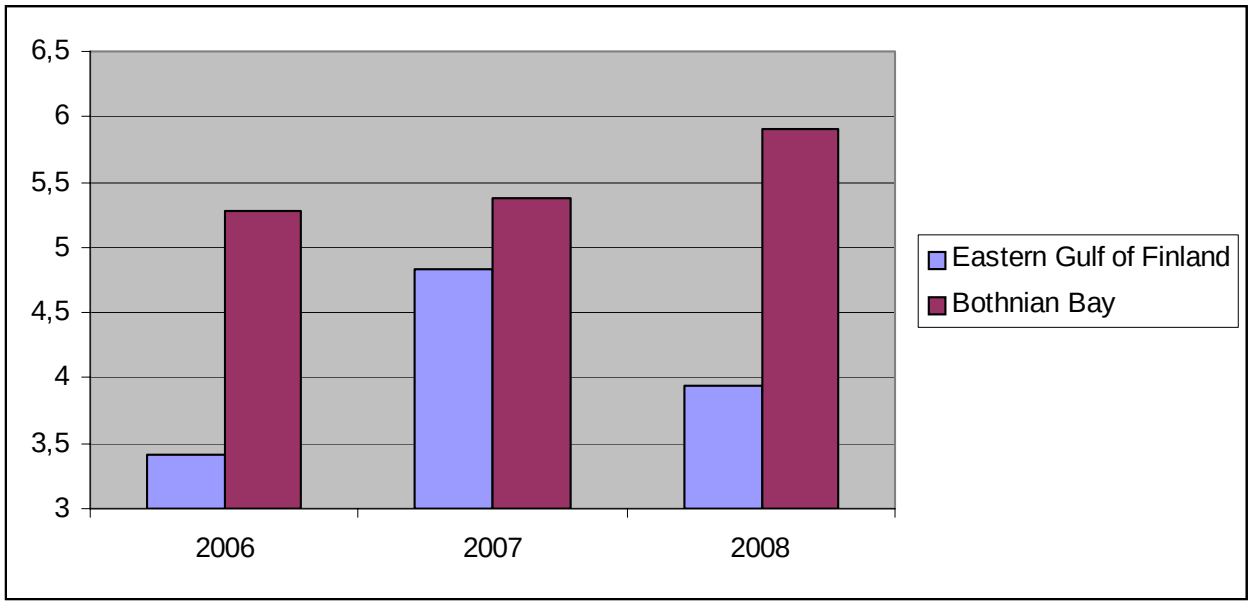


2005/06=>2006/07 +9%

2006/07=>2007/08 +1%

International maritime transportation in Finland

in January-April in mil. tonnes



+41% +2% -18% +10%

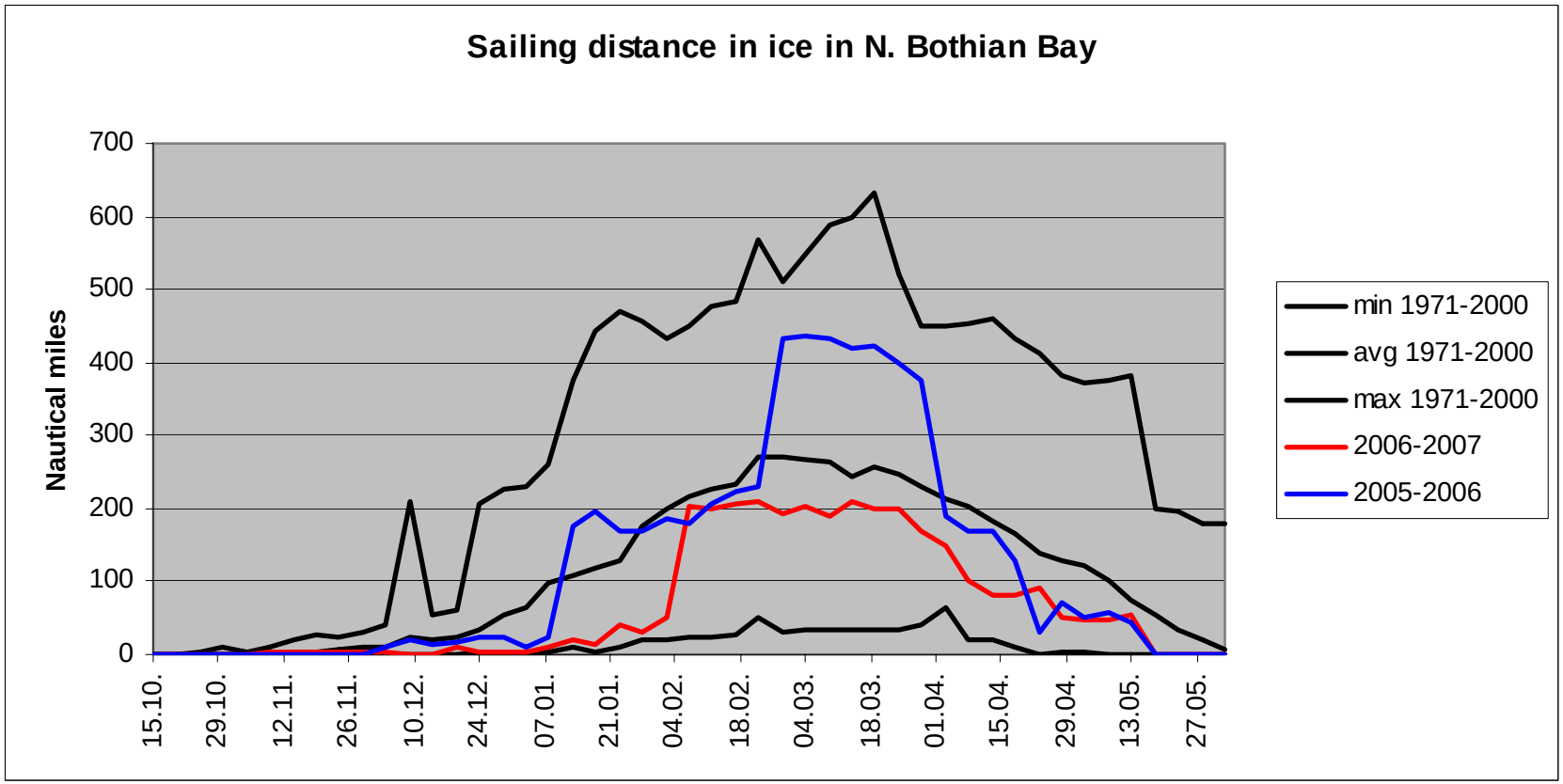
2005/06=>2006/07 Eastern Gulf of Finland +41%; Bothian Bay +2%

2006/07=>2007/08 Eastern Gulf of Finland -18%; Bothian Bay +10%

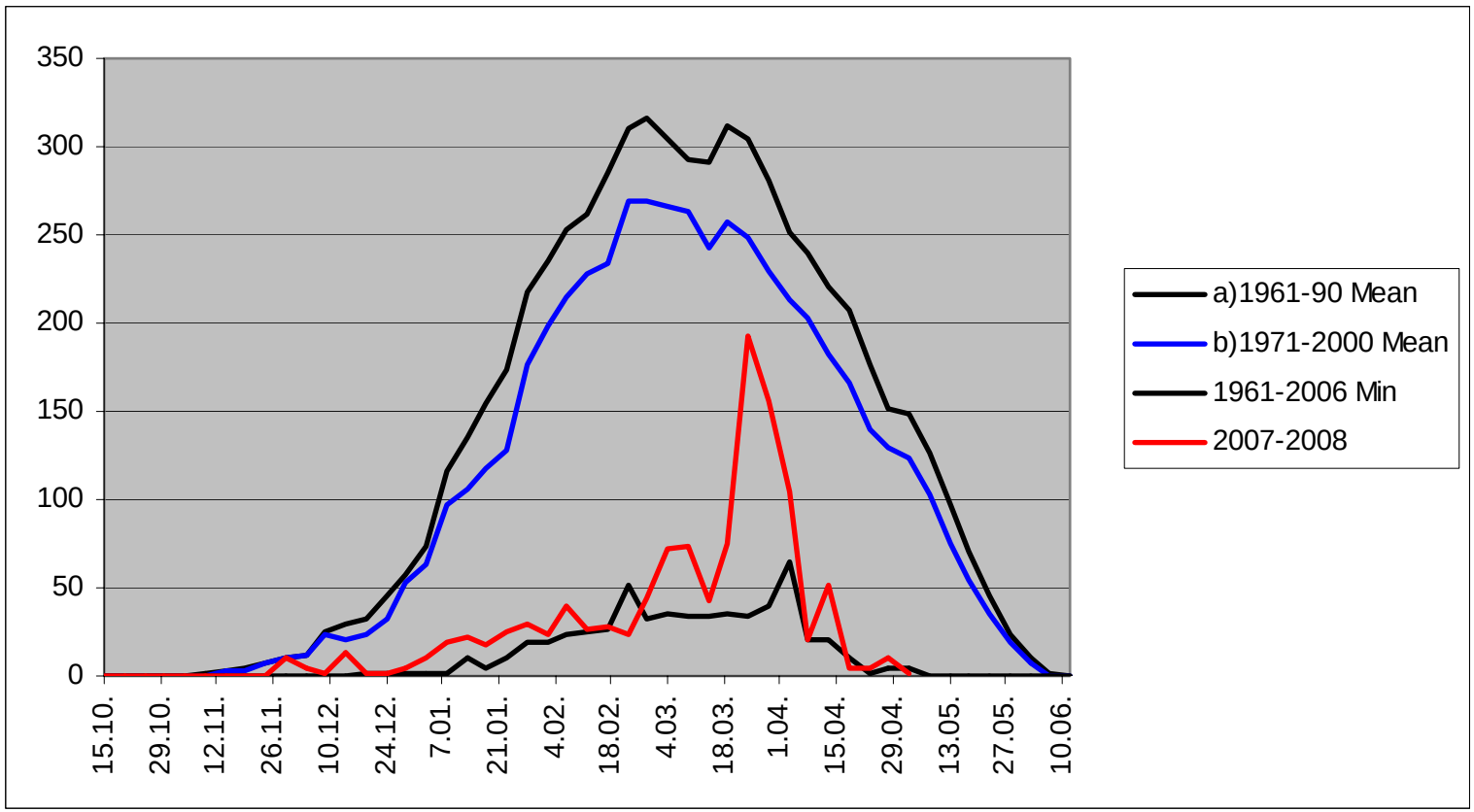
Eastern Gulf of Fin.= Loviisa, Kotka, Hamina

Bothian Bay= Tornio, Kemi, Oulu, Raahe, Kokkola, Pietarsaari

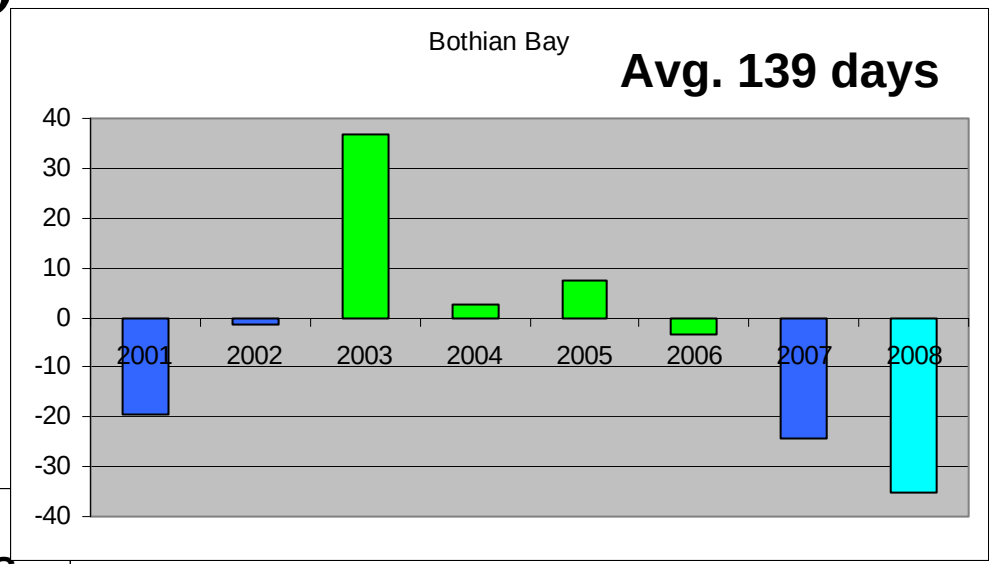
Sailing distance in ice to N Bothnian Bay

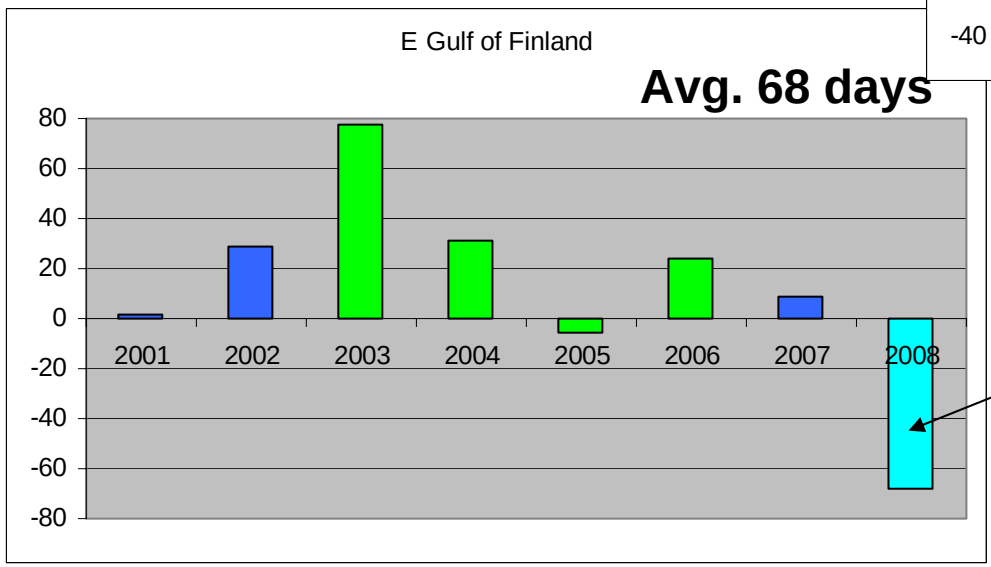


Sailing distance in ice to N Bothnian Bay



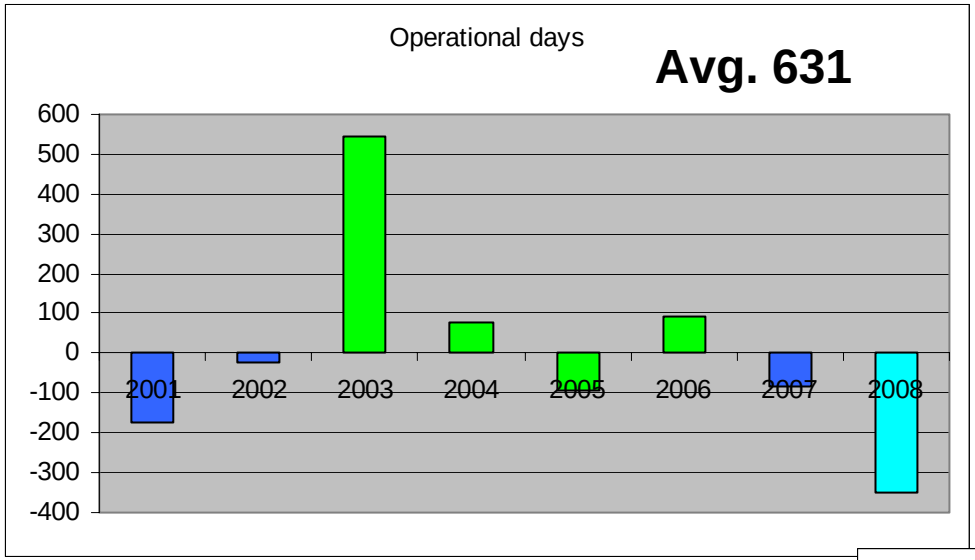
Anomaly (1990/91-1999/2000): Length of restrictions to navigation in Finland (days)

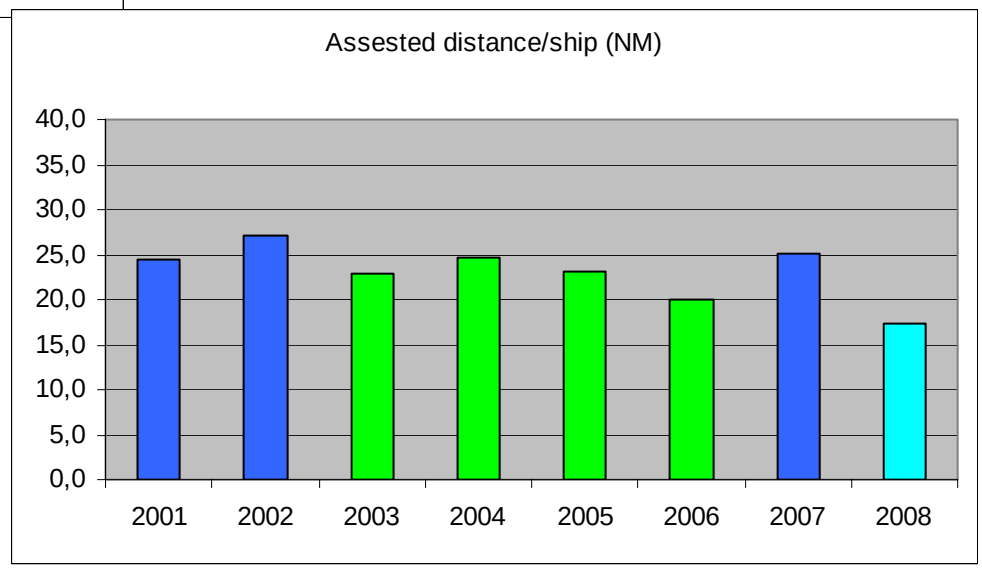




No restictions

Anomaly (2000/01-2007/08): Finnish icebreakers





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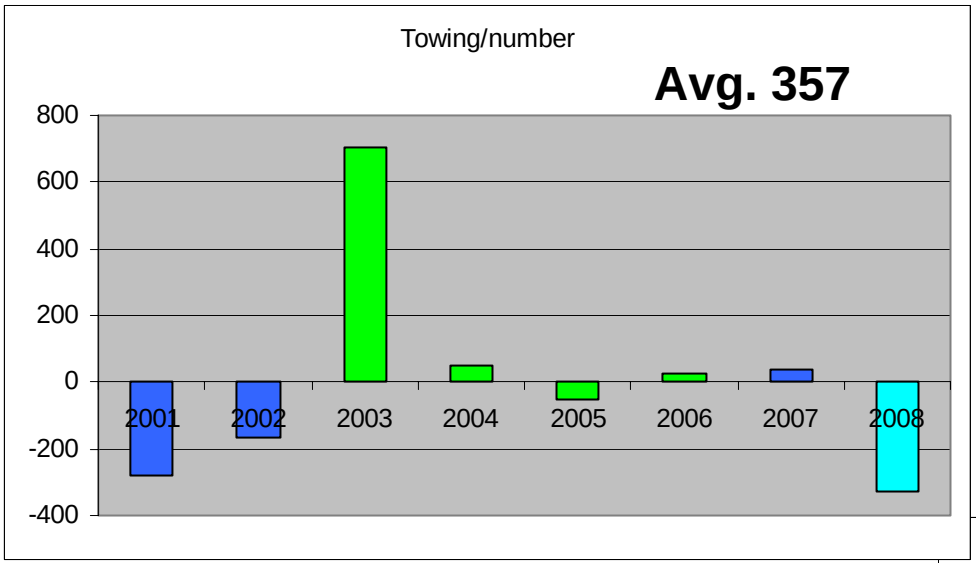
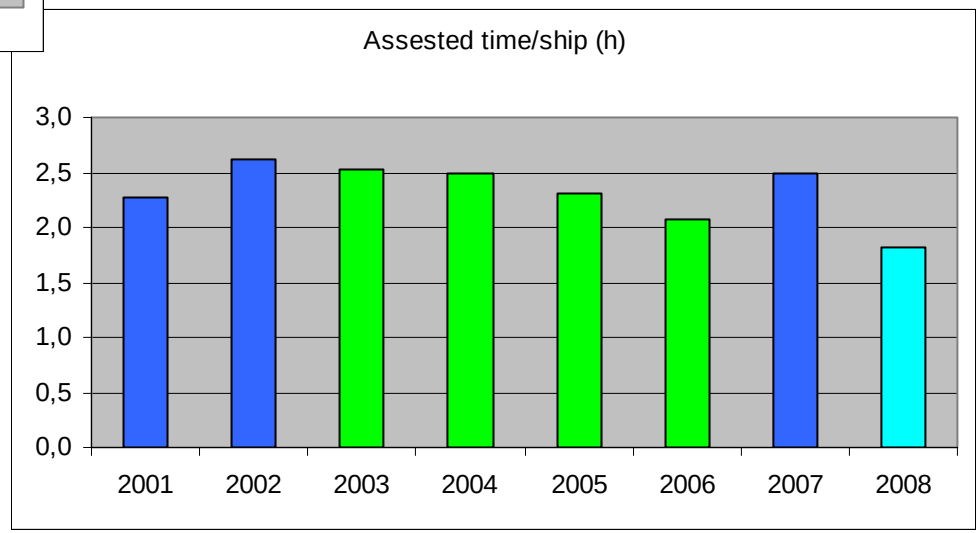
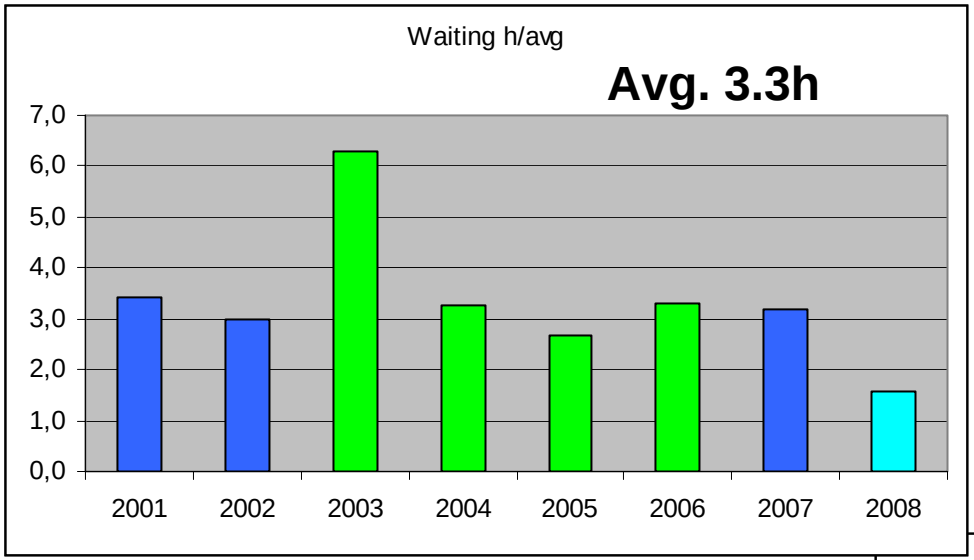
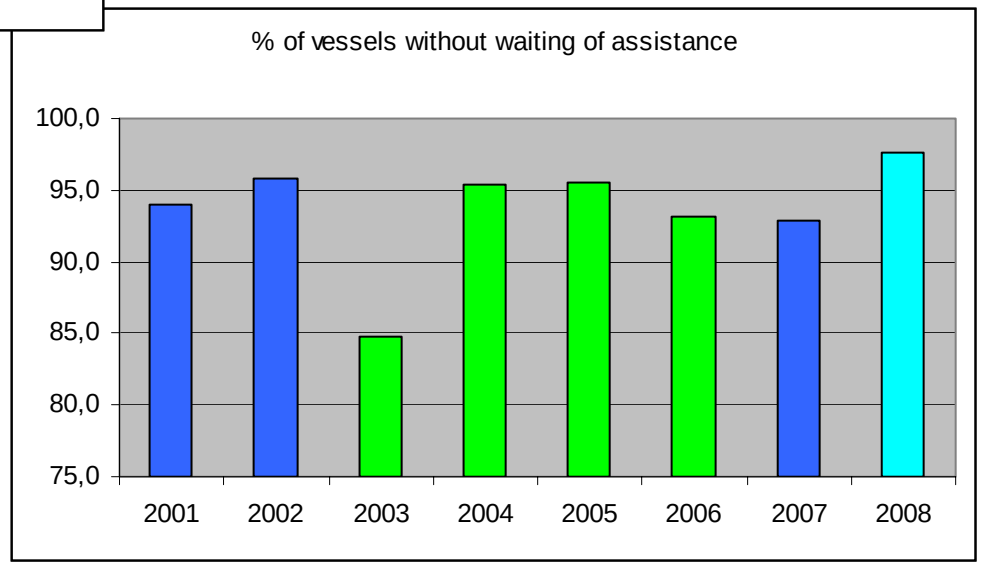




2000/01-2007/08: Finnish icebreakers





Avg. 93.7%

Challenges:

- Ice still plays an important role in the future
- Growth of maritime transportation is large
- Risk of hazards is growing
- Risk of environmental accidents is growing
- Icebreaking is effective
- Challenges of changing world

- How services must answer to the challenges?
  - User-friendly information
  - Information in user's scale
  - Information which user understands
  - Distibution system(s)