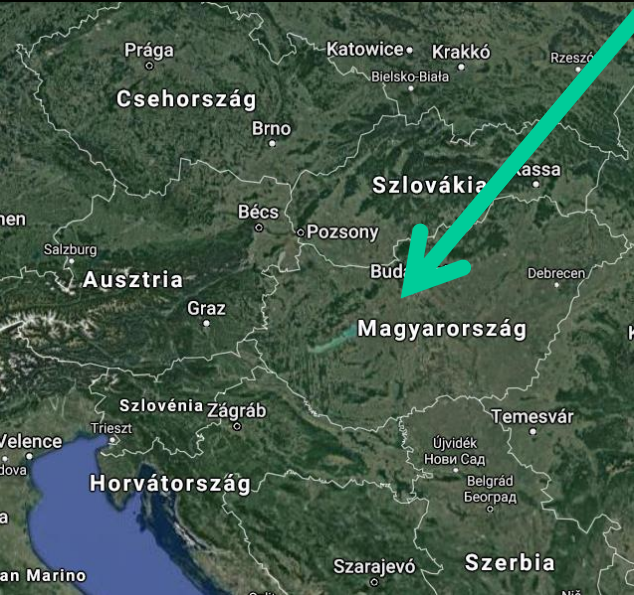


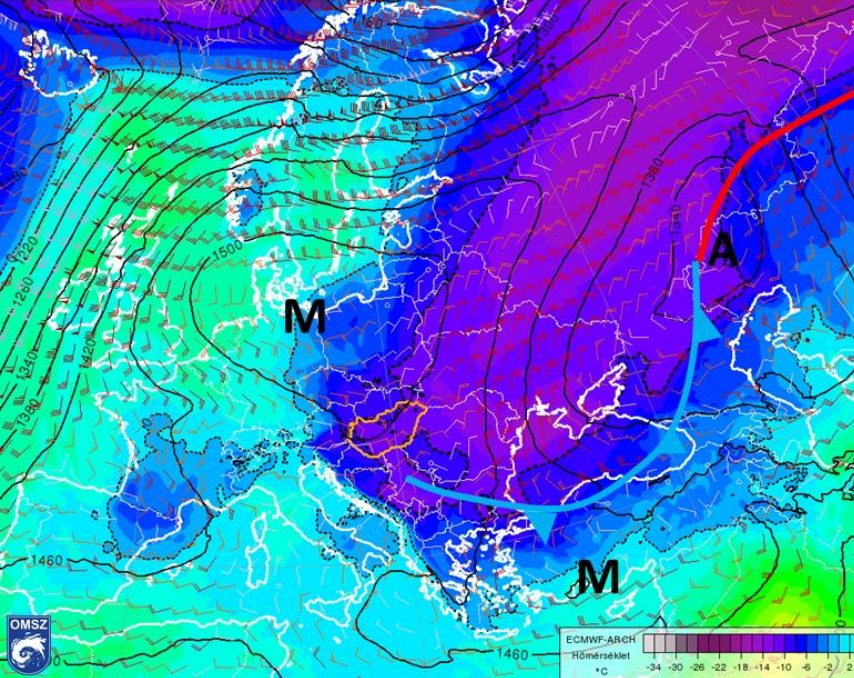
# Ice on Lake Balaton

*Ákos Horváth*

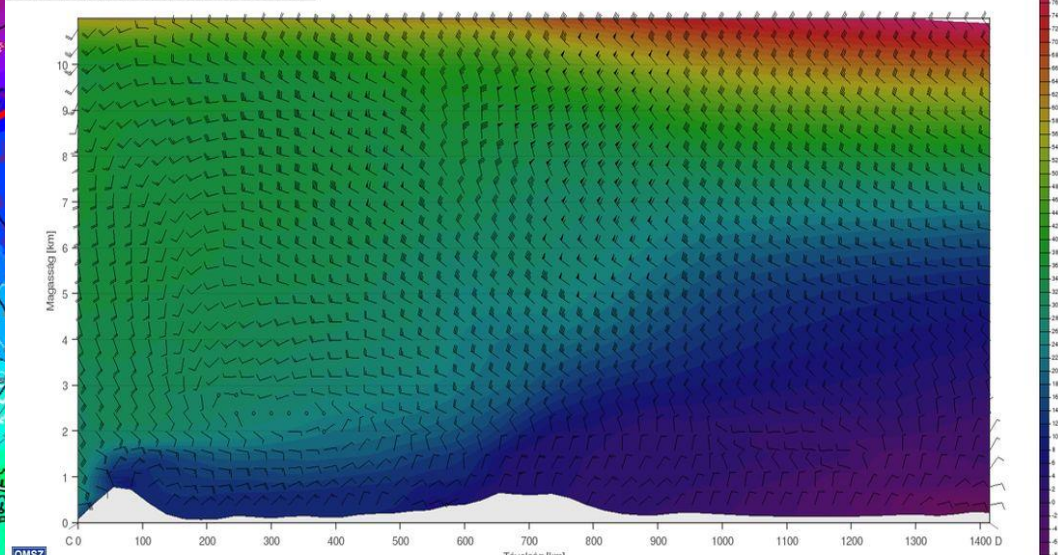
Hungarian Meteorological Service  
Storm Warning Observatory  
Siófok



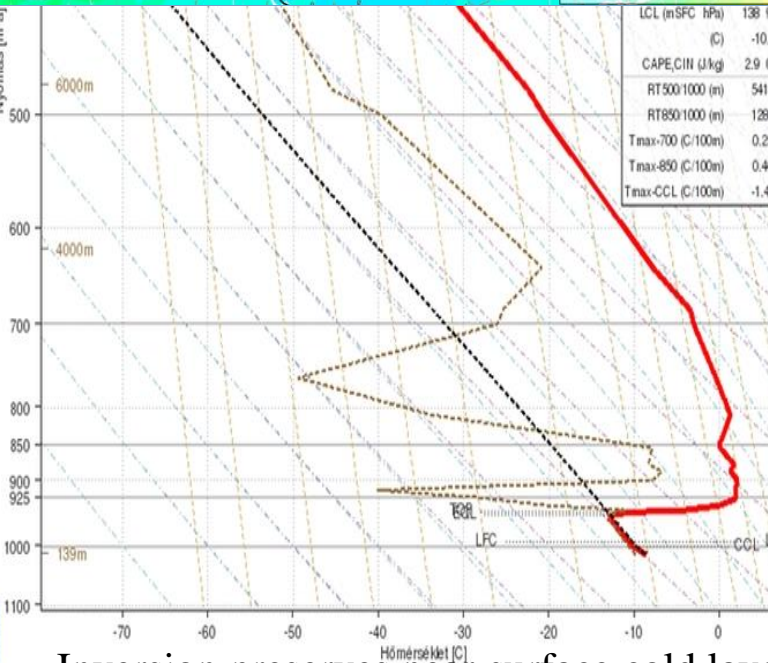
ECMWF-ARCH Hőmérséklet (°C) [850 hPa] 2017. jan 26. csütörtök 00:00  
 ECMWF-ARCH Geopotenciál (m) [850 hPa] 2017. jan 26. csütörtök 00:00  
 ECMWF-ARCH Szél (m/s) [850 hPa] 2017. jan 26. csütörtök 00:00



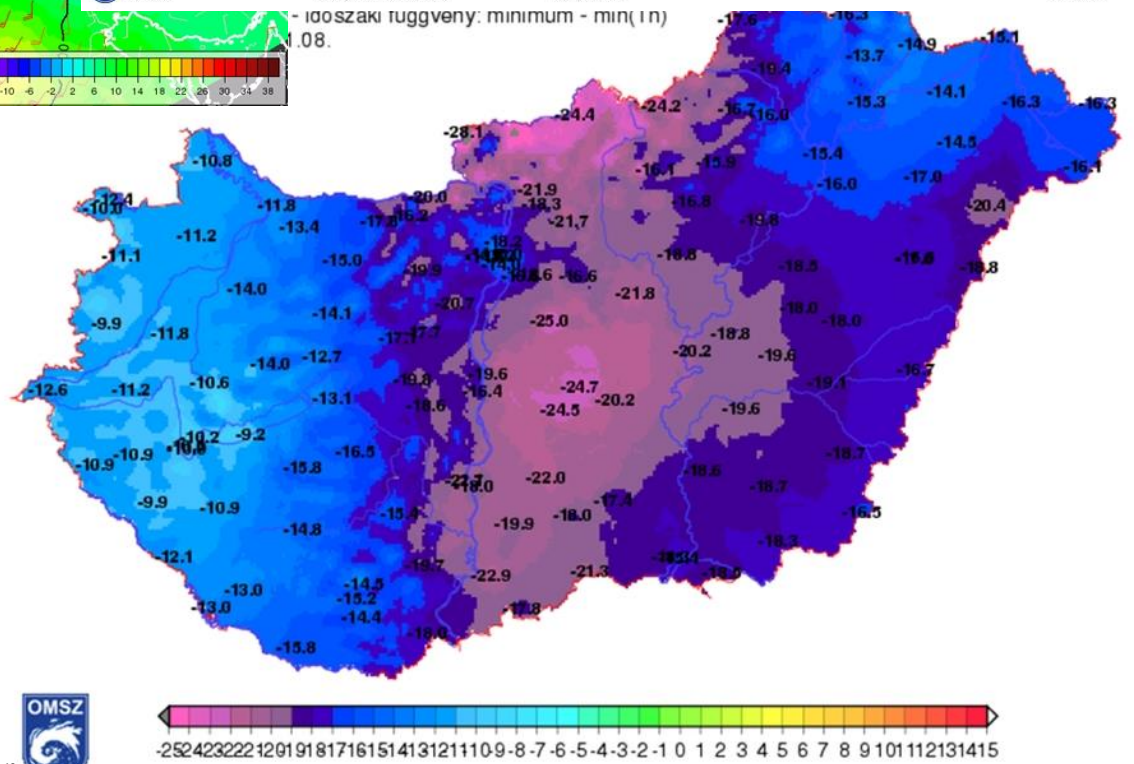
ECMWF-E ThetaE (°C) 2018. feb 23. péntek 18:00 (+6h)  
 ECMWF-E Szél (m/s) 2018. feb 23. péntek 18:00 (+6h)



Zadar Kárpát-medence Kárpátok Minszk



LCL (mSFC hPa)	139.99
(C)	-10.2
CAPE/CIN (J/kg)	2.9.01
RT500/1000 (m)	5418
RT850/1000 (m)	1286
Tmax-700 (C/100m)	0.25
Tmax-850 (C/100m)	0.46
Tmax-CCL (C/100m)	-1.45



Inversion preserves near-surface cold layer



- Postfrontal strong wind stirs up the water
- Water temperature falls to (near) 0 C
- Waves throw water to the frozen beach.



# Appearance of ice on the lake

## 1. Mirror ice (better case)

- It thickens fast
- Amorphous



~ 8 cm is strong enough  
to hold a man

Appearance of ice on the lake

2. „cube” ice (worse case)  
breccia surface





Drifting ice barrier



ice barrier anchors to the coastline

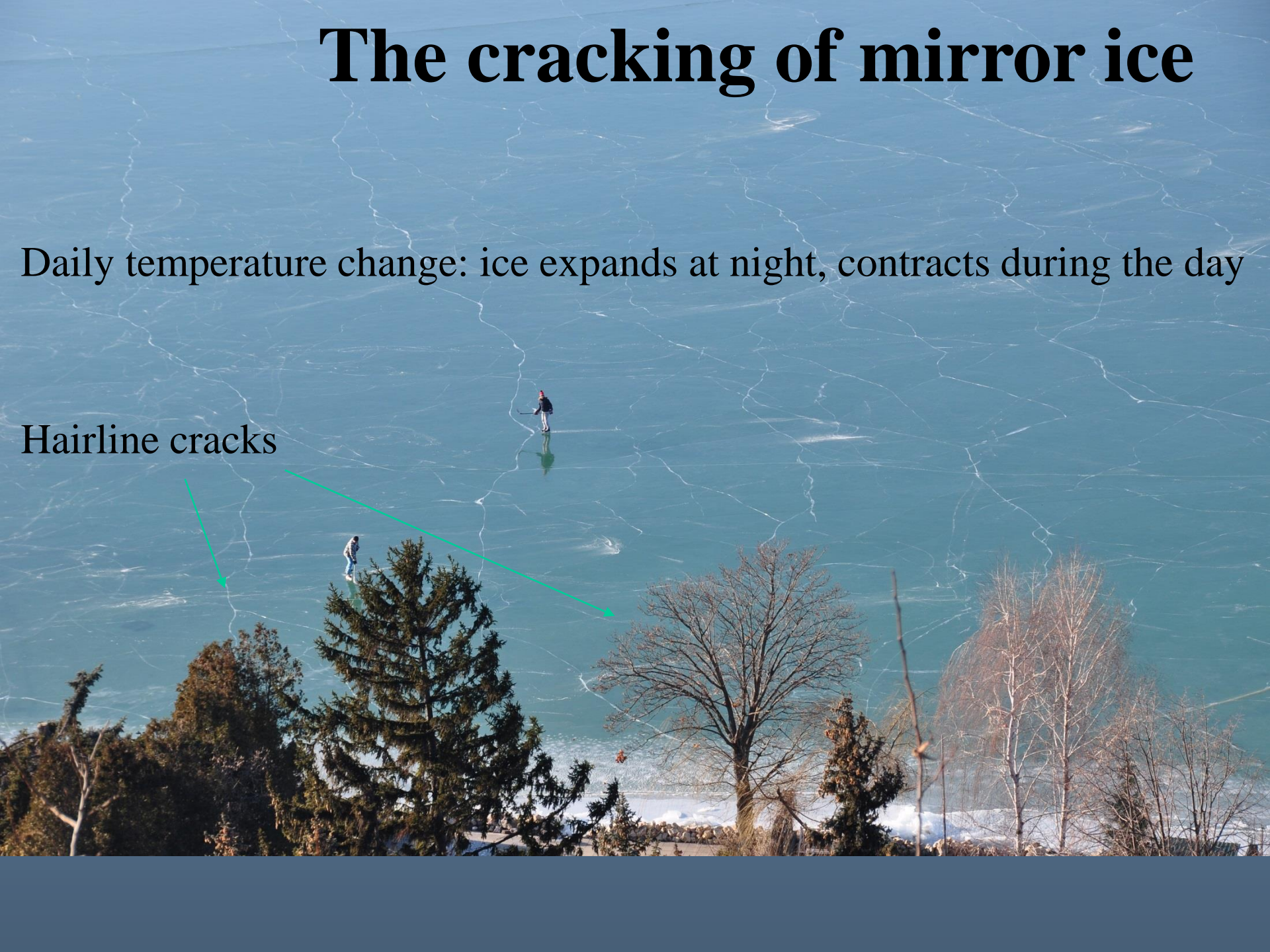


Ice formation starts in the wave  
save zone

# The cracking of mirror ice

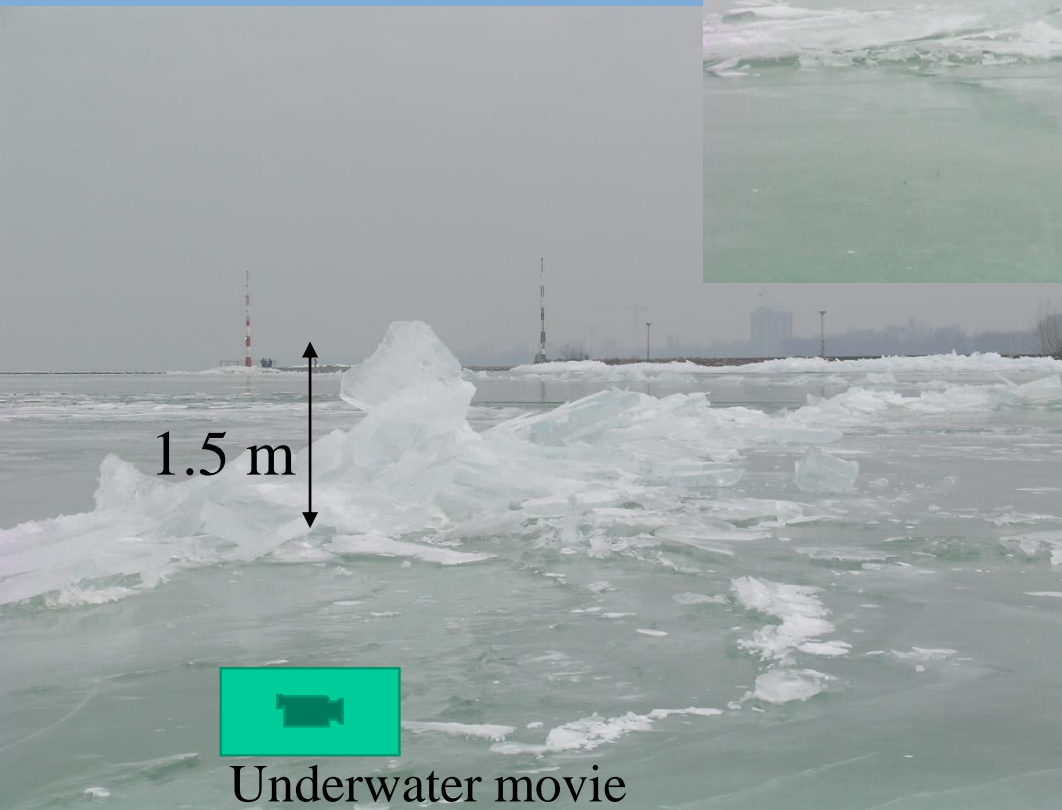
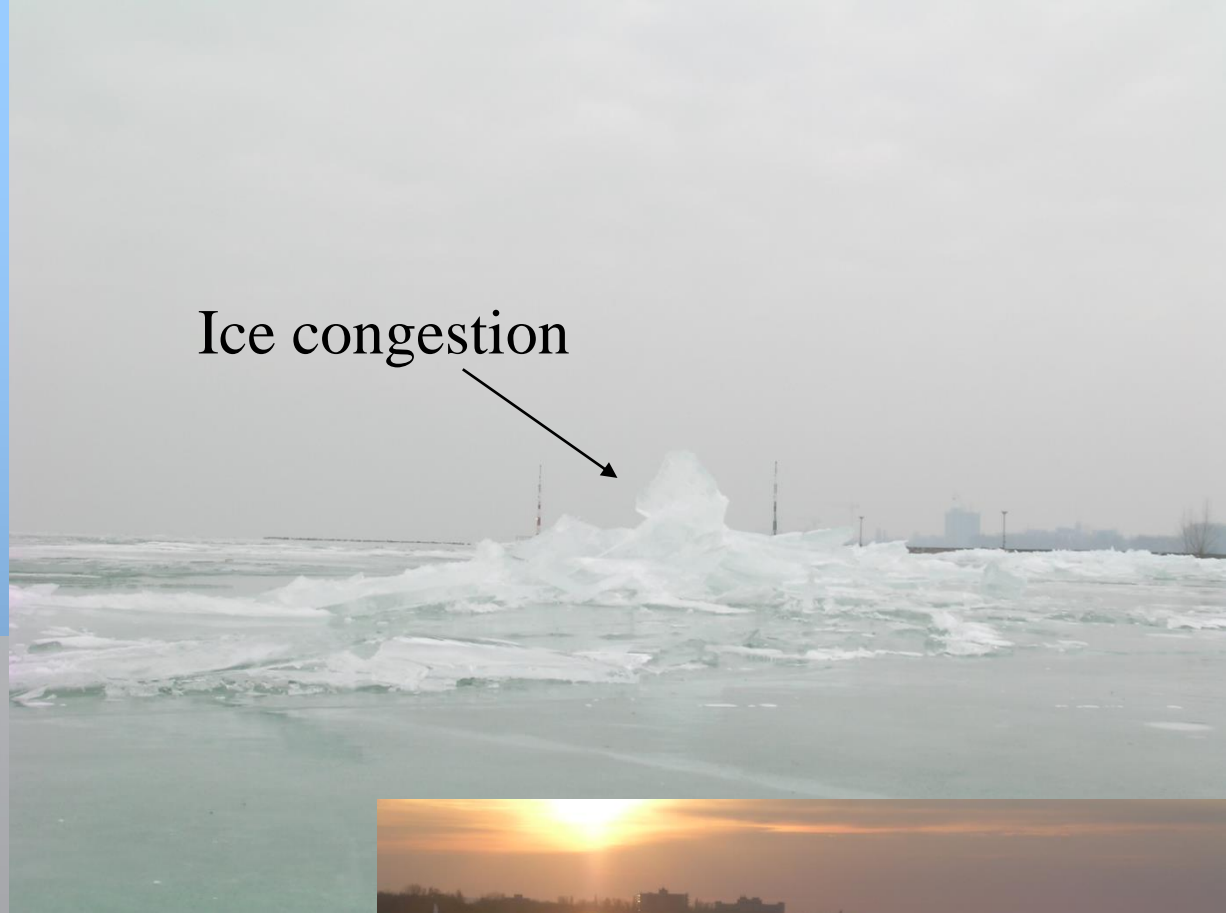
Daily temperature change: ice expands at night, contracts during the day

Hairline cracks



Ice formations:  
„mikro plate tectonics”

Ice congestion

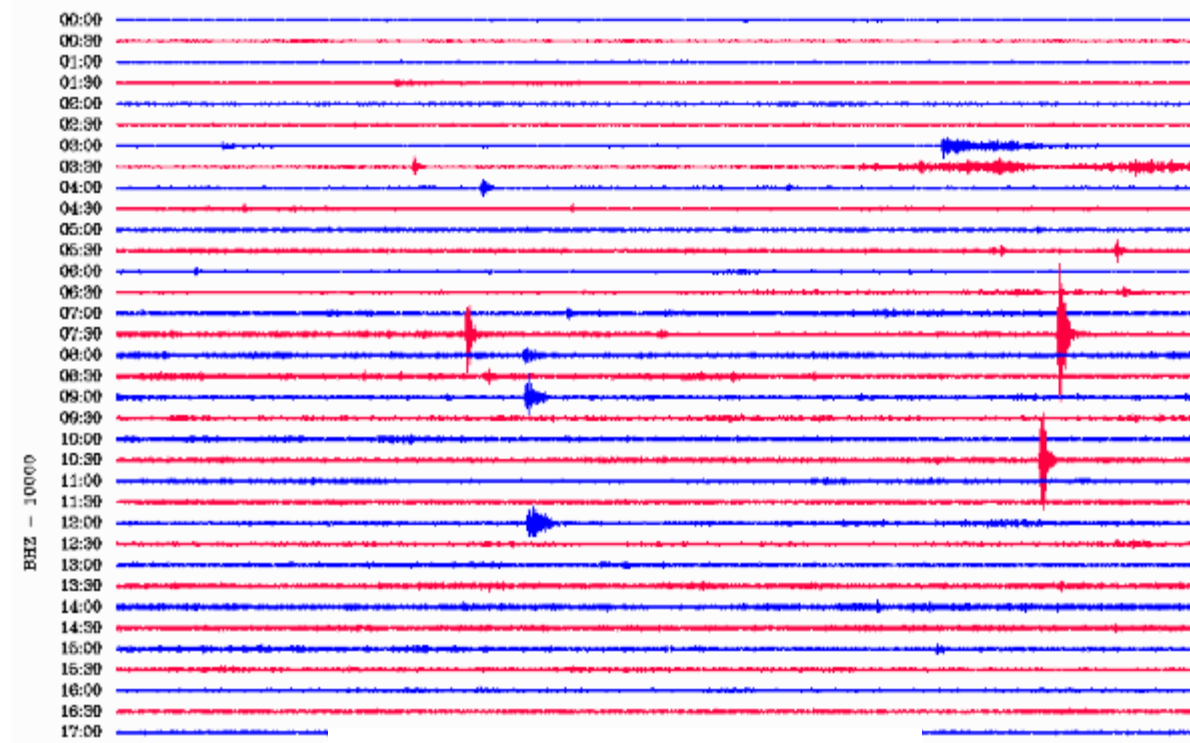




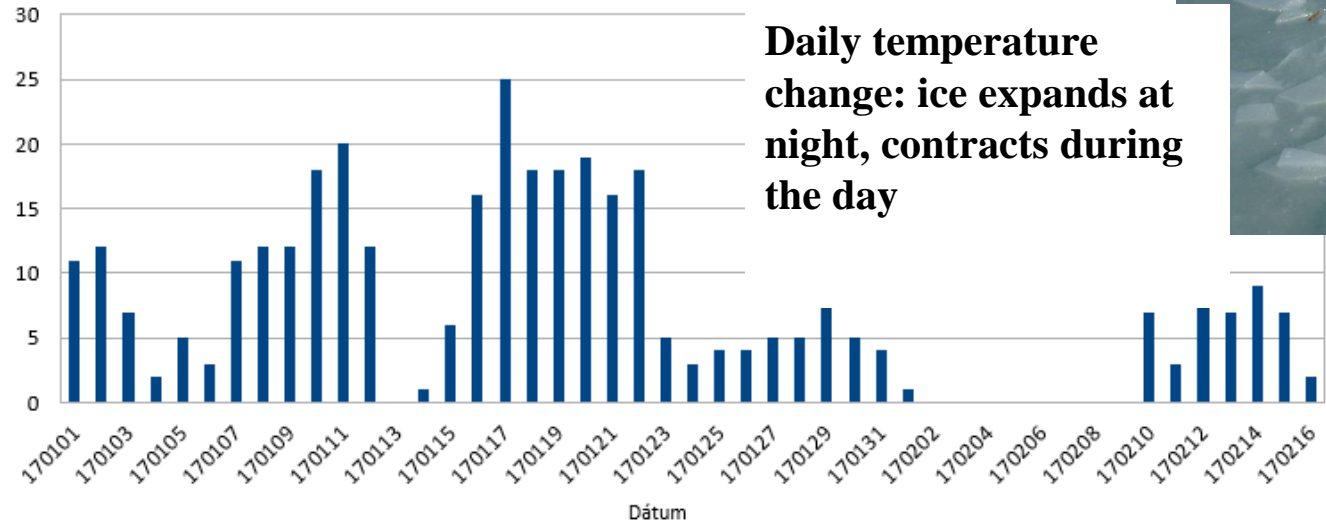
The floes form „icebergs” in the shallow (~2 m) water. They significantly reshape the bottom of the lake.



Applied filter: WWSSN-SP

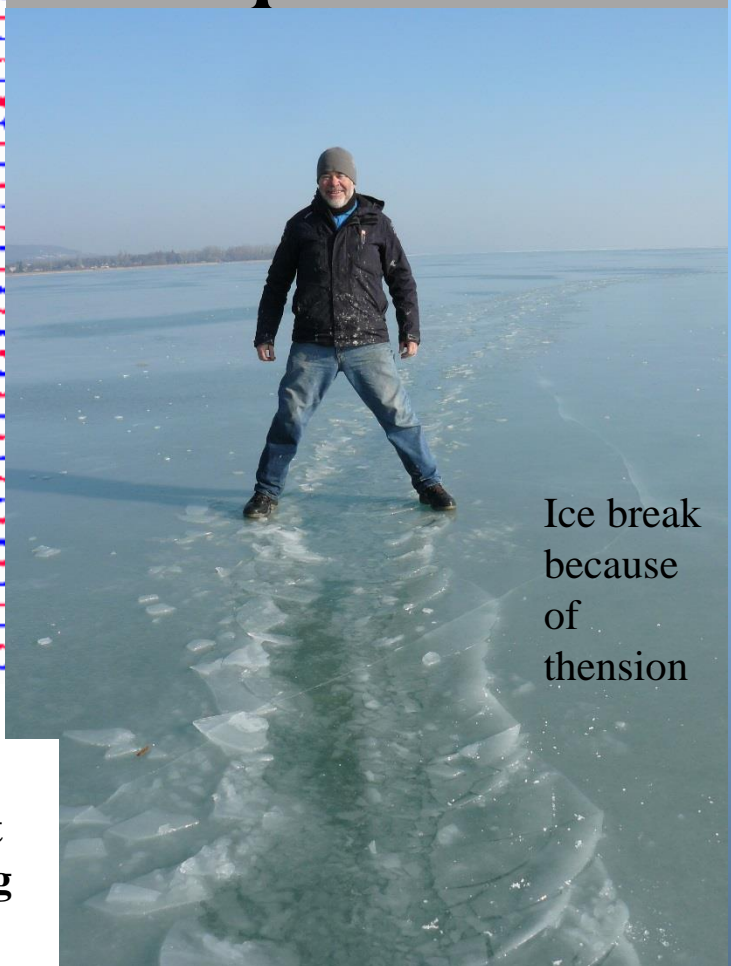


Numbers of daily ice quakes

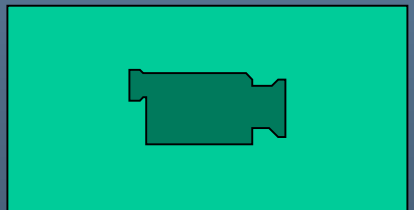


**Daily temperature change: ice expands at night, contracts during the day**

# Ice quakes

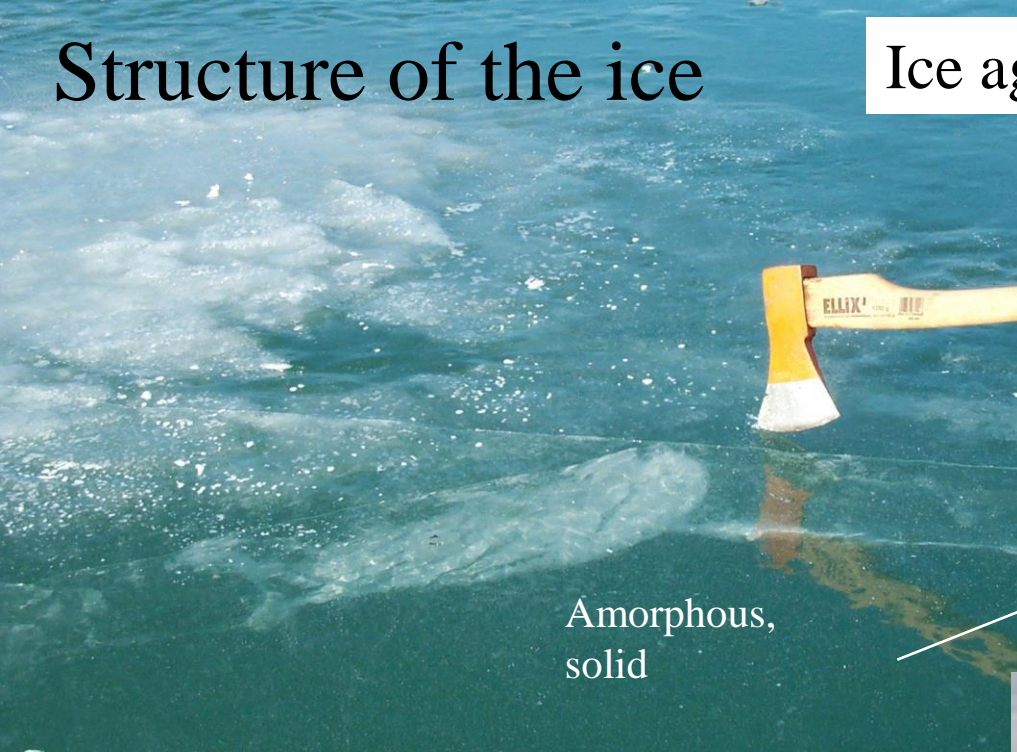


Ice break because of thension



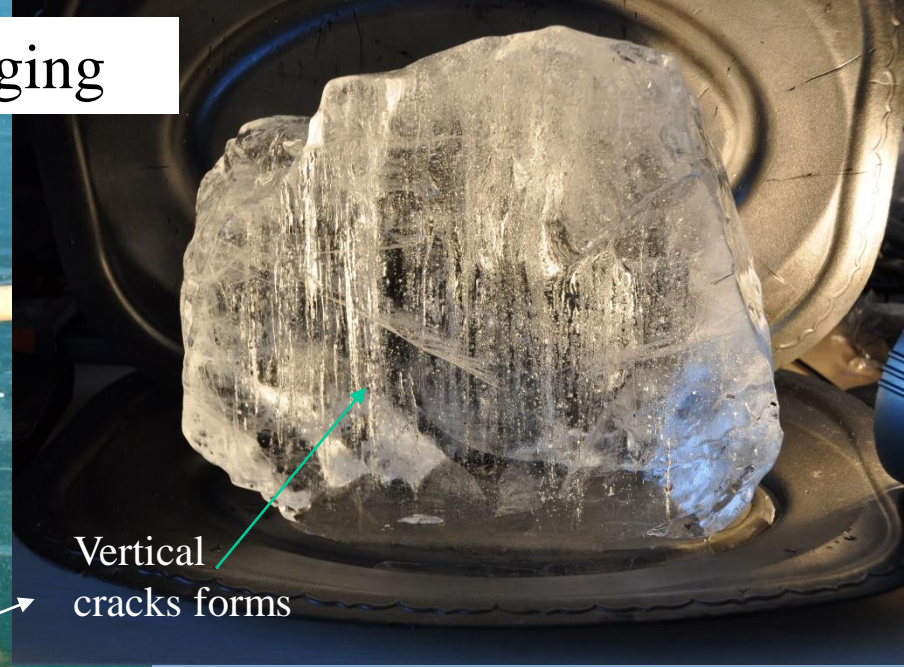
Ice break because of wind

# Structure of the ice



Amorphous,  
solid

# Ice aging



Vertical  
cracks forms



fragile

Under water movie

# The destructive ice

Hard ice (in Januar)



Stone and ice mound

Soft ice ( at the end of Februar)





Wind direction

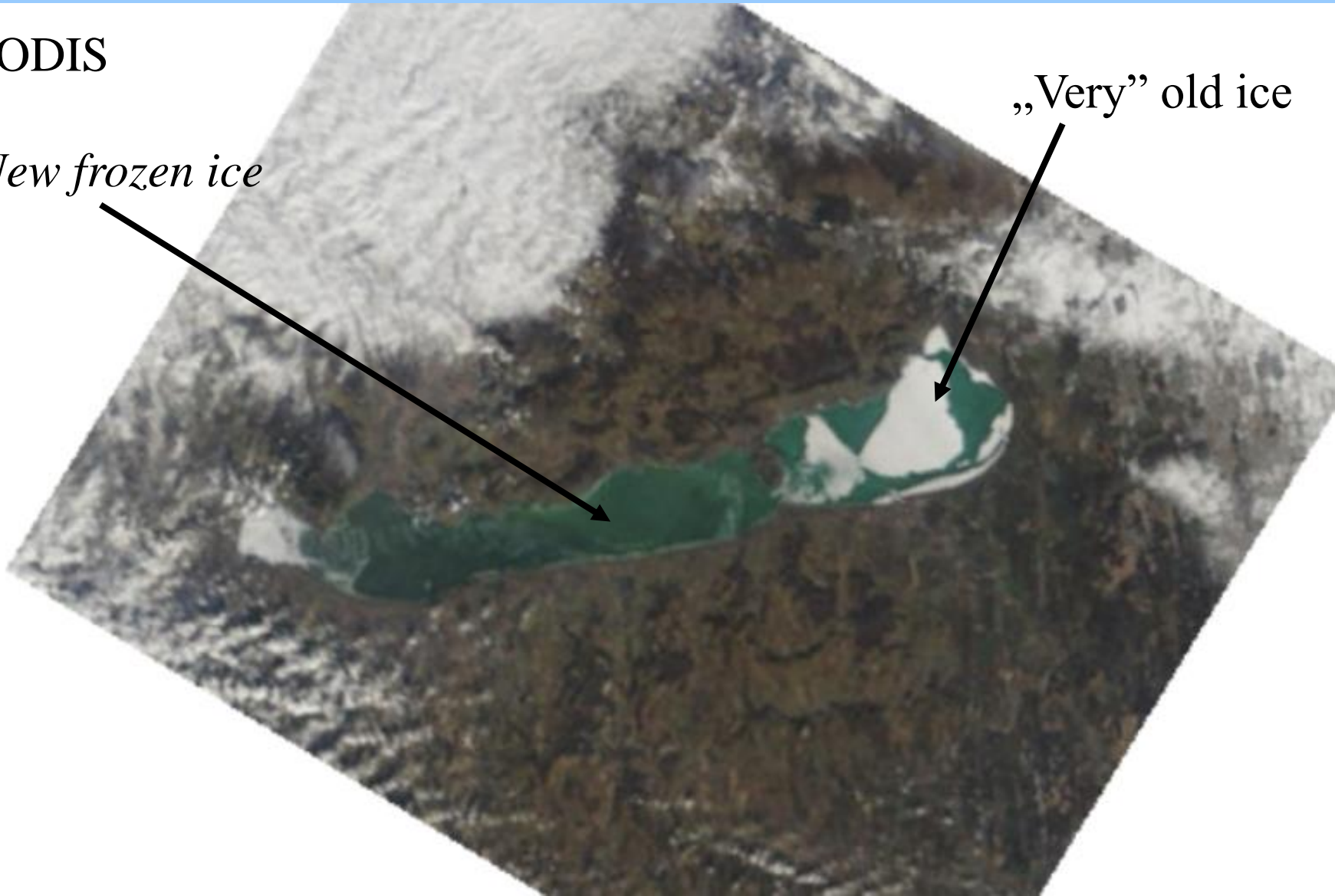
Refrozen ice

Old fragmented ice

MODIS

*New frozen ice*

„Very” old ice





Snow on the ice



Thick but weak strenght

# Fast moving snow shower over mirror ice

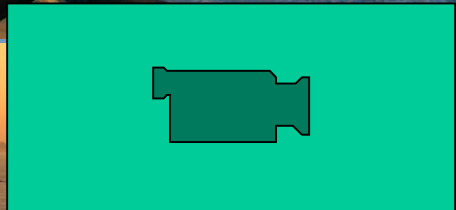




Melting



Jegzajlas\_deli\_szel



Jégekása

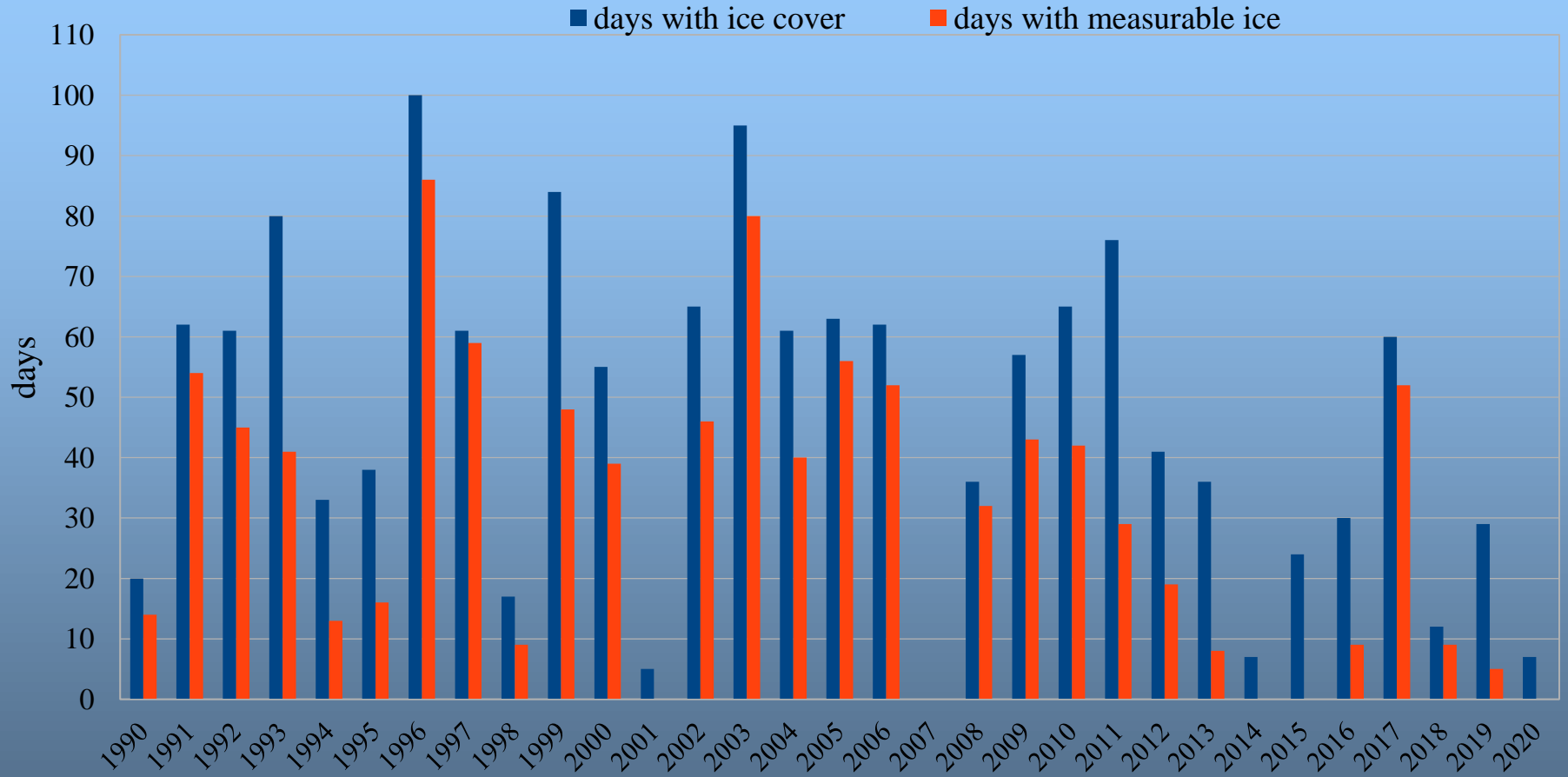


Jégfolyam 2021

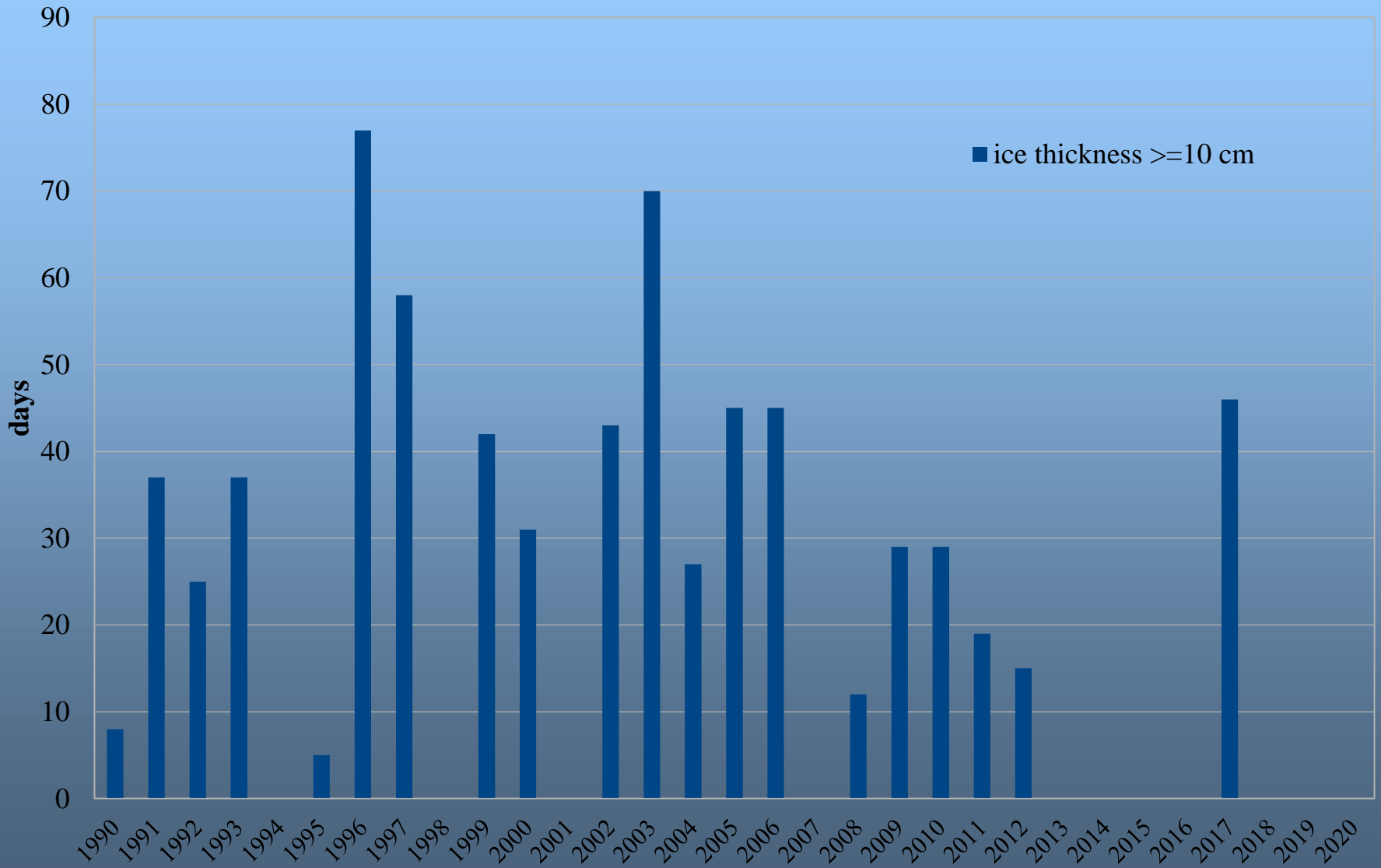
# Measure of the ice



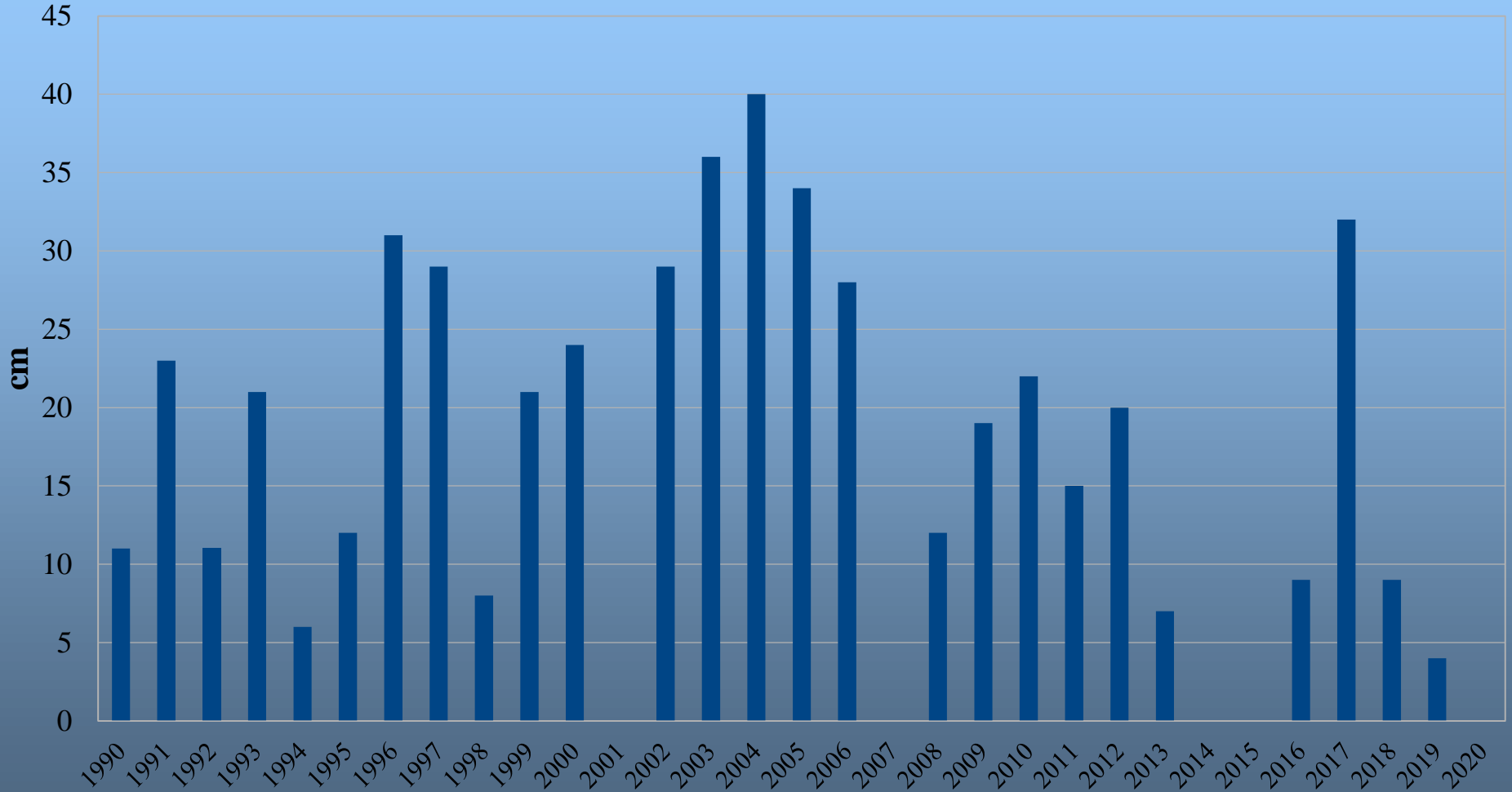
# Days with ice in lake Balaton 1990-2020



Days with ice cover at least 10 cm in lake Balaton 1990-2020



1990-2020: maximum thickness of ice cover in Balaton



# People on the ice



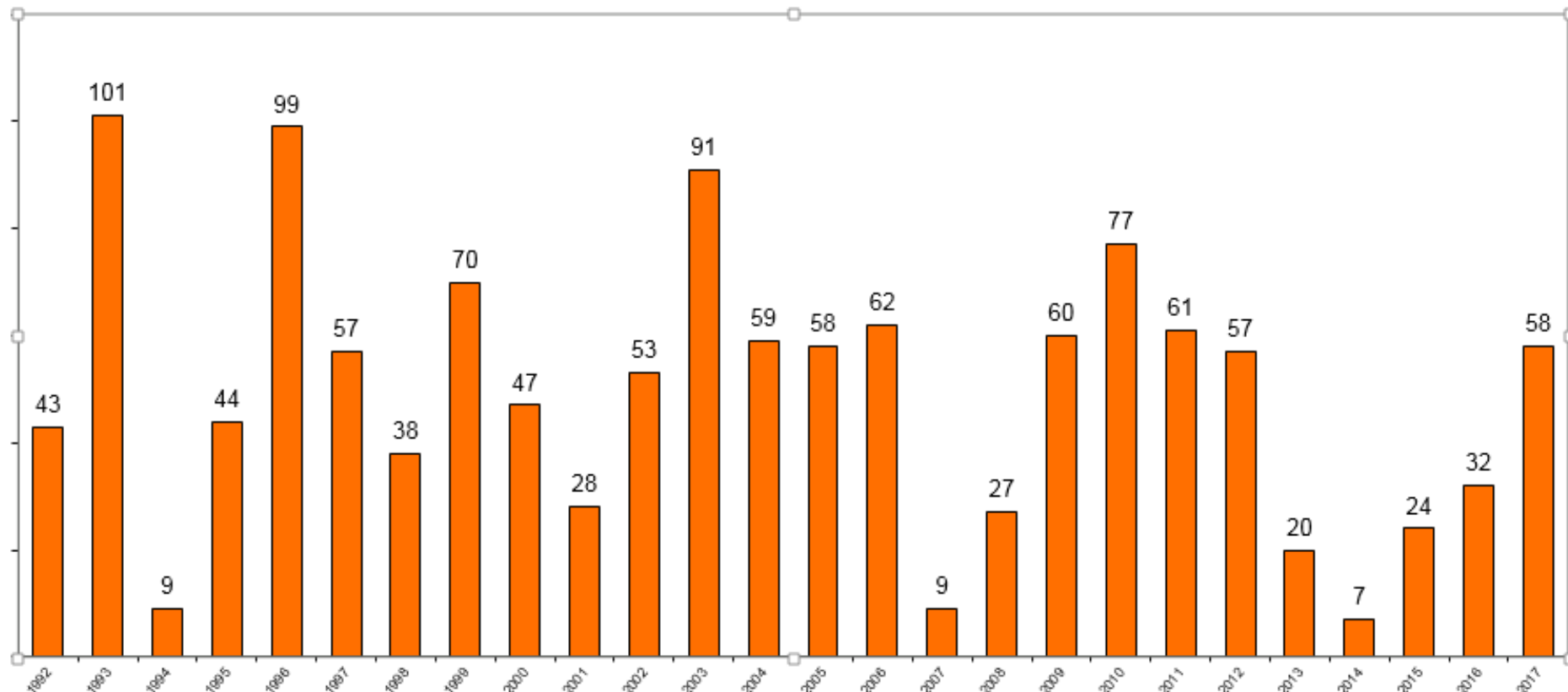


**Thank you for your attention**





## Jeges napok száma



## Átlag jégvastagság

