Andrii Murdza

PhD student at Thayer School of Engineering at Dartmouth College

Almost 2 years at UNIS as an external master student under SMIDA & SITRA projects

Arrived in Autumn 2014

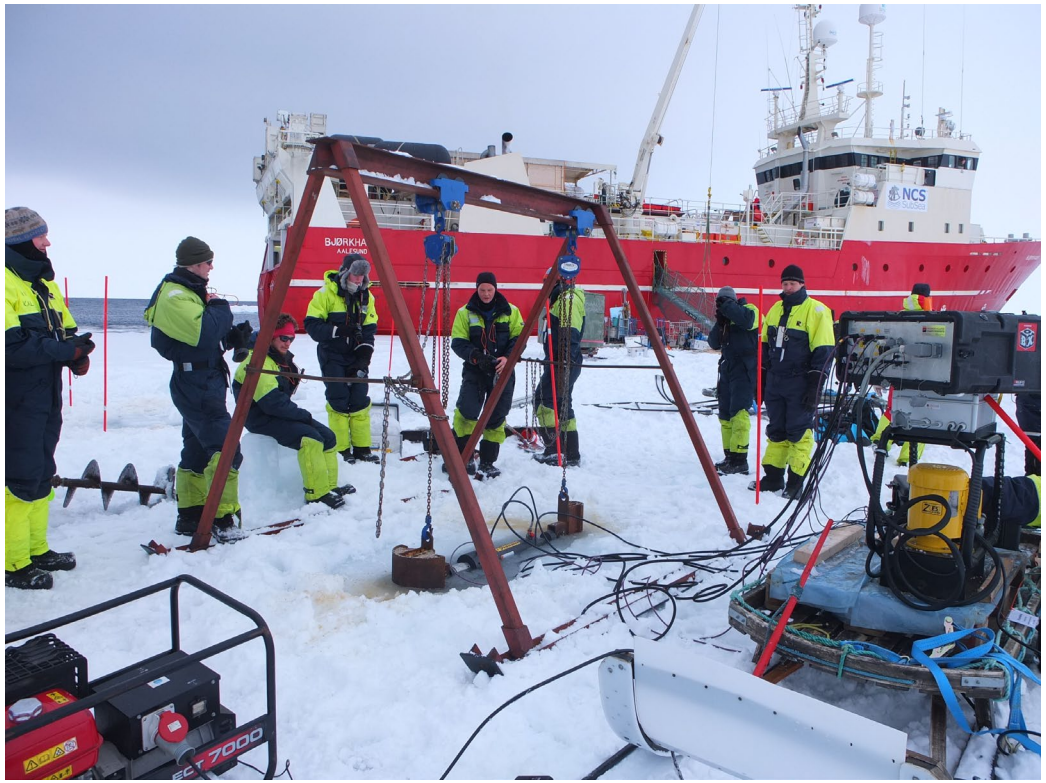
SMIDA (Safety of Maritime operation and sustainable industrial development in the Arctic)

Taking classes

Spring (January-May) 2015

SMIDA (Safety of Maritime operation and sustainable industrial development in the Arctic)

- Taking classes
- Conducting research



Autumn 2015 & Spring 2016

SITRA (Safety of Industrial Development and Transportation Routes in the Arctic)

- Conducting research

June 2016

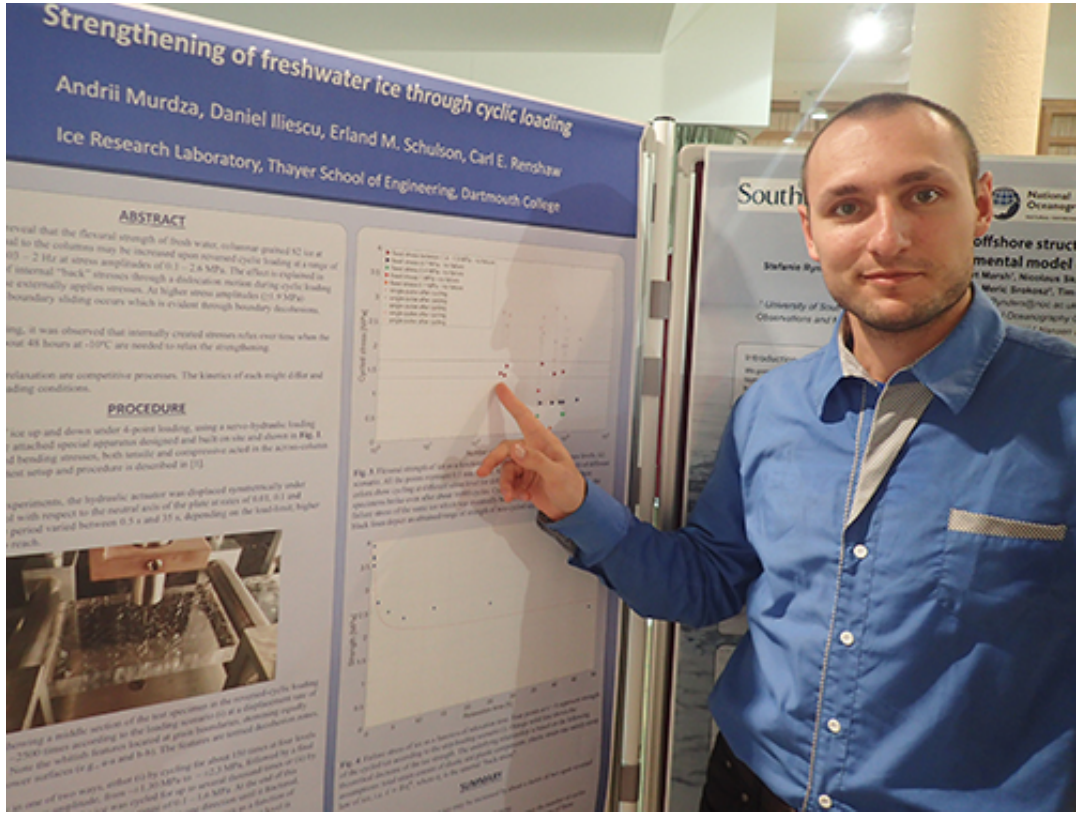
SITRA (Safety of Industrial Development and Transportation Routes in the Arctic)

- Vising Memorial university and participation at IAHR conference

Autumn 2017

SITRA (Safety of Industrial Development and Transportation Routes in the Arctic)

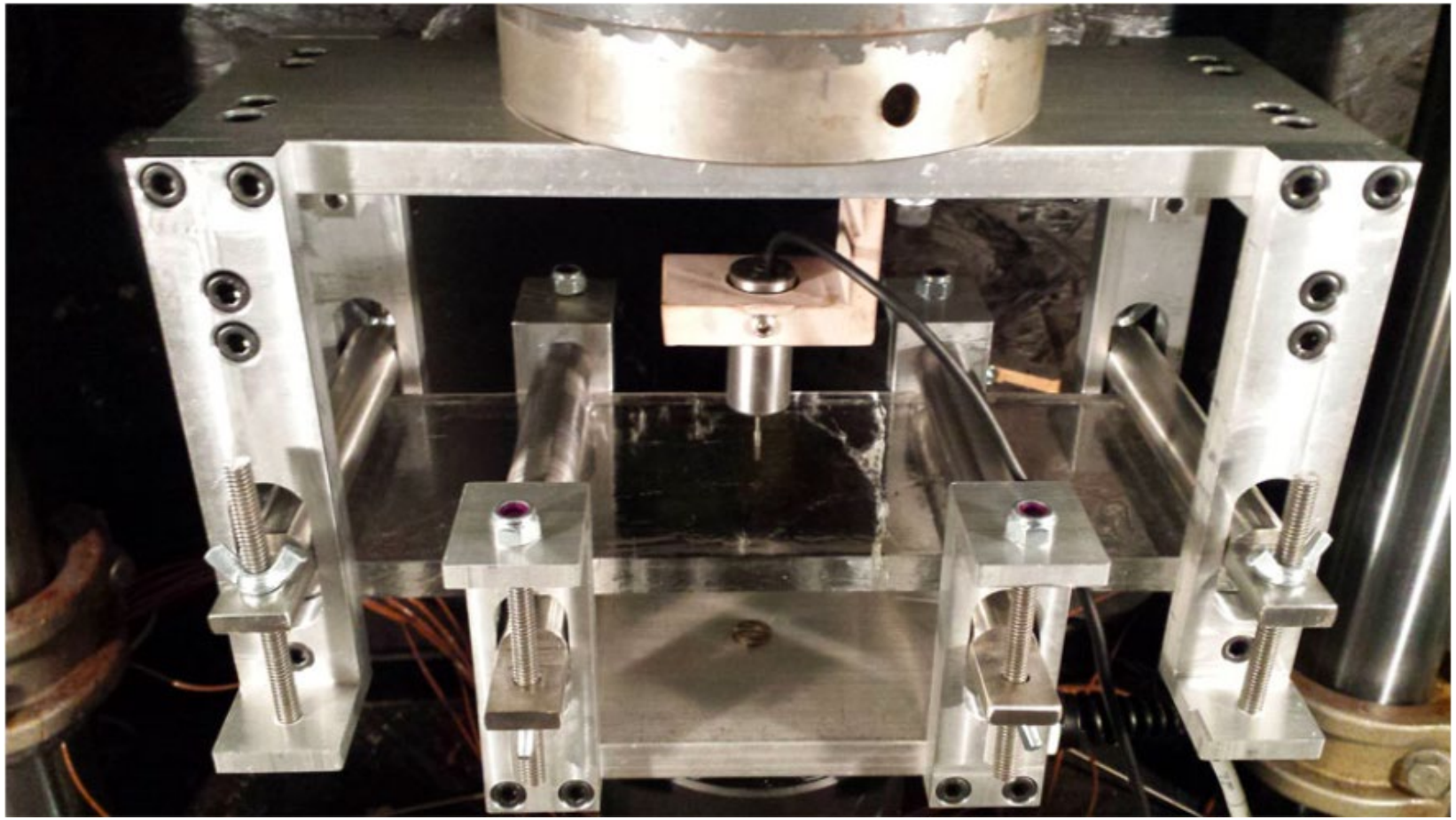
- Participation in Sea-ice structure interaction workshop at the Isaac Newton Institute for Mathematical Sciences in Cambridge, UK



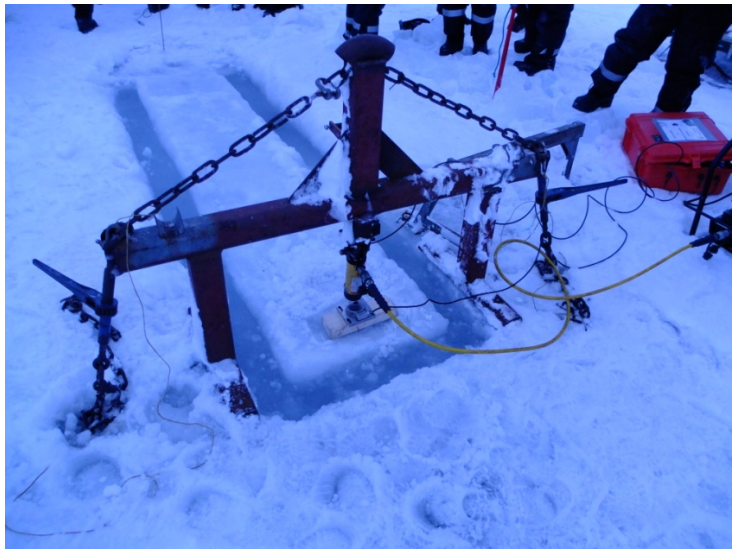
Now: Autumn 2016 – Autumn 2019

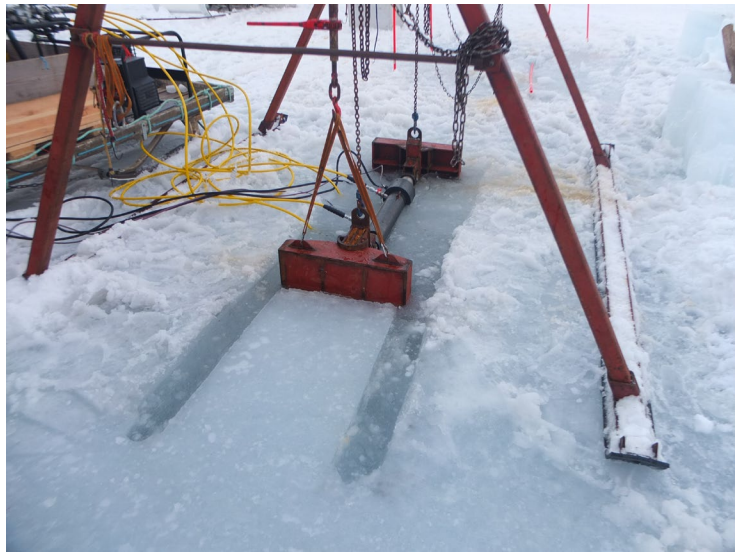
PhD degree at Dartmouth College

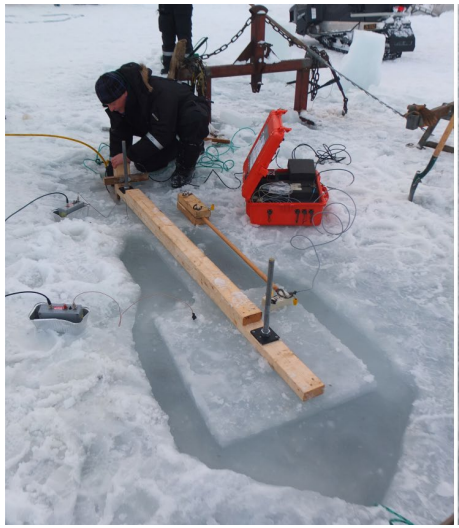
- Fatigue of ice

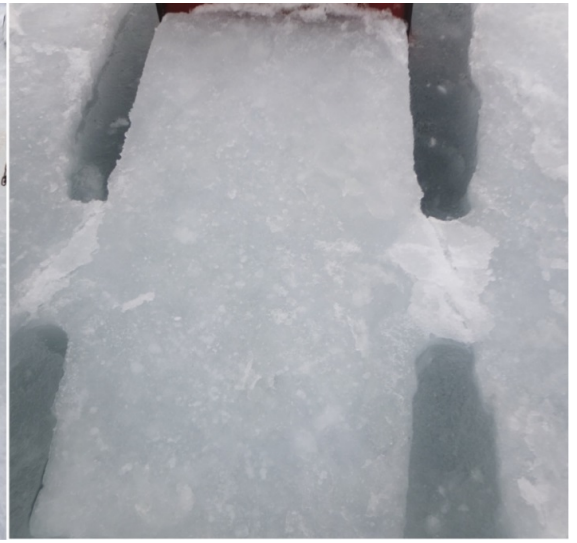


Field experiments



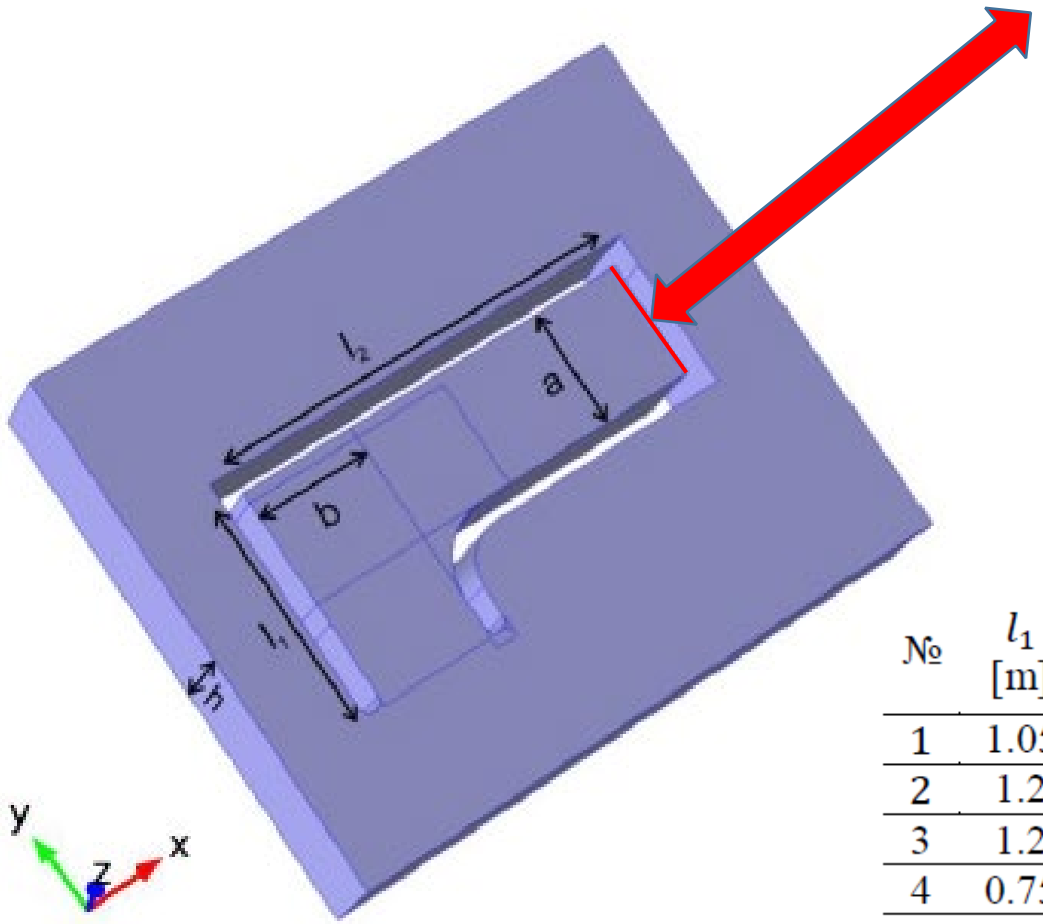




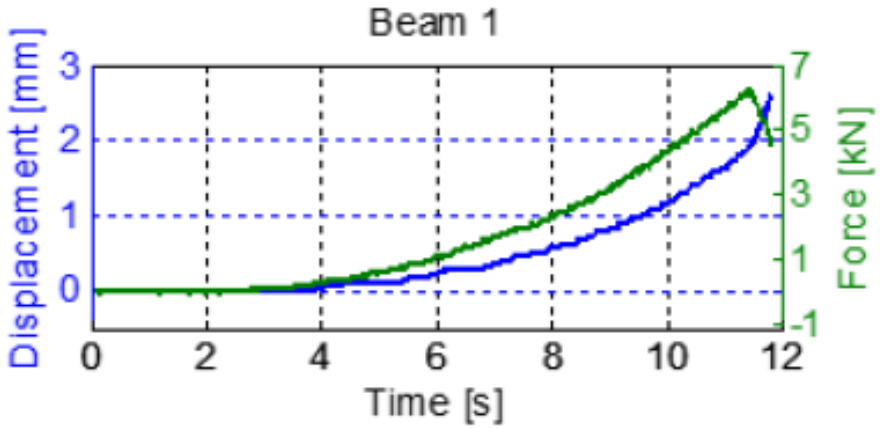


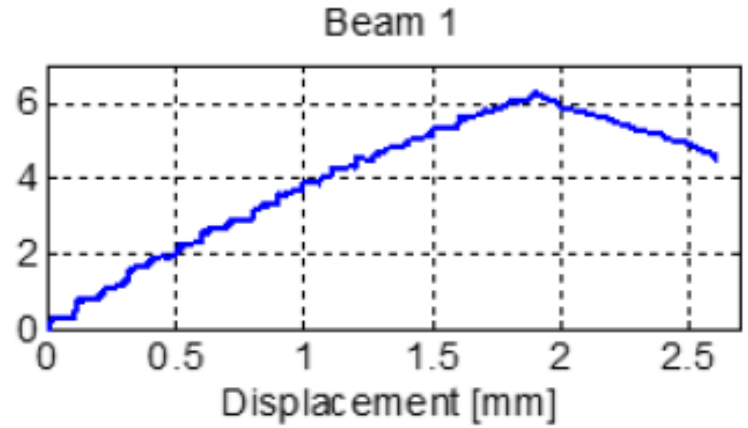
L-beam test

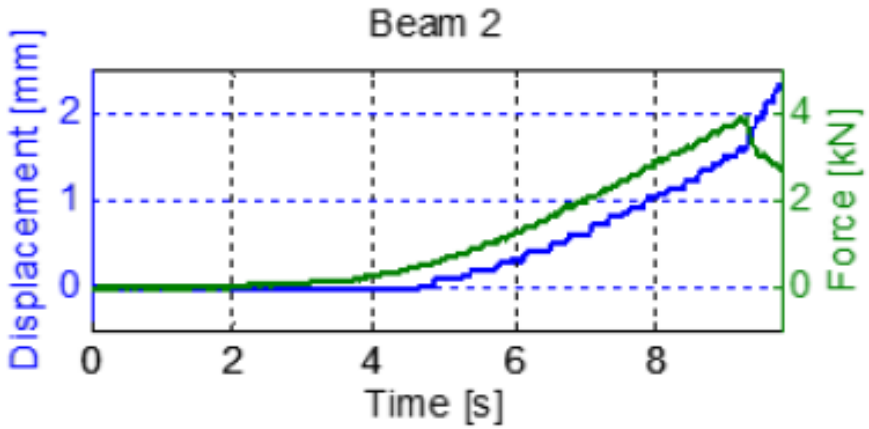
L-beam test configuration

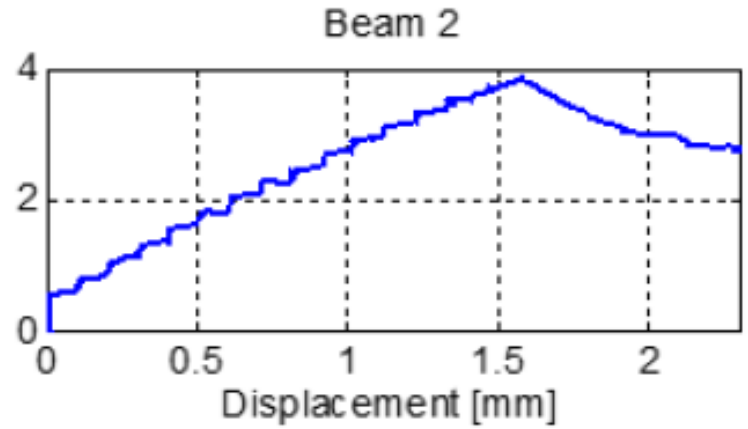


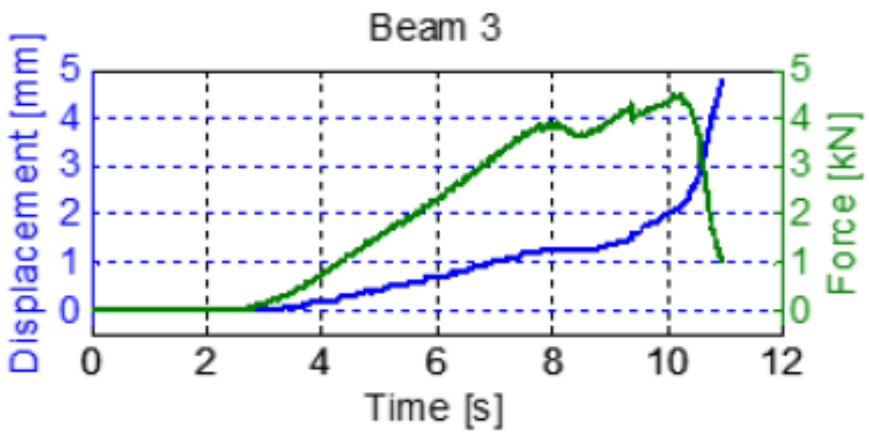
№	l_1 [m]	l_2 [m]	a [m]	b [m]	h [m]	Loading	Ice type	F_{max} [N]	δ (F_{max}) [mm]	α [°]	T_{ice} [°C]
1	1.05	1.95	0.55	0.55	0.56	Down	sea	6267	1.94	26.6	-3.4
2	1.2	2.1	0.6	0.6	0.53	Down	sea	3881	1.6	9.2	-3.2
3	1.2	2.08	0.6	0.65	0.6	Up	sea	4506	2.14	33.8	-3
4	0.75	1.1	0.42	0.36	0.36	Down	fresh	2559	0.71	13.3	0
5	0.68	1.15	0.4	0.44	0.36	Up	fresh	3528	0.72	—	0
6	—	2.55	0.85	0.85	0.28	Down	fresh	1436	3.2	—	0
7	1.3	2	0.62	0.65	0.59	Down	sea	6897	2.59	—	-3.3
8	1.15	1.45	0.55	0.6	0.59	Down	sea	7064	1.05	—	-3.3
9	1.57	1.22	0.9	0.57	0.59	Down	sea	6142	0.66	11.5	-3.3

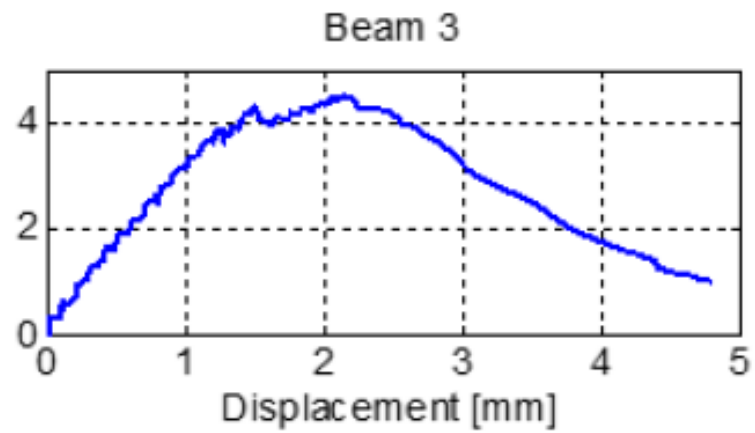

Beam 1
Displacement [mm]
Force [kN]
Time [s]


Beam 1
Displacement [mm]


Beam 2
Displacement [mm]
Force [kN]
Time [s]


Beam 2
Displacement [mm]


Beam 3
Displacement [mm]
Force [kN]
Time [s]


Beam 3
Displacement [mm]

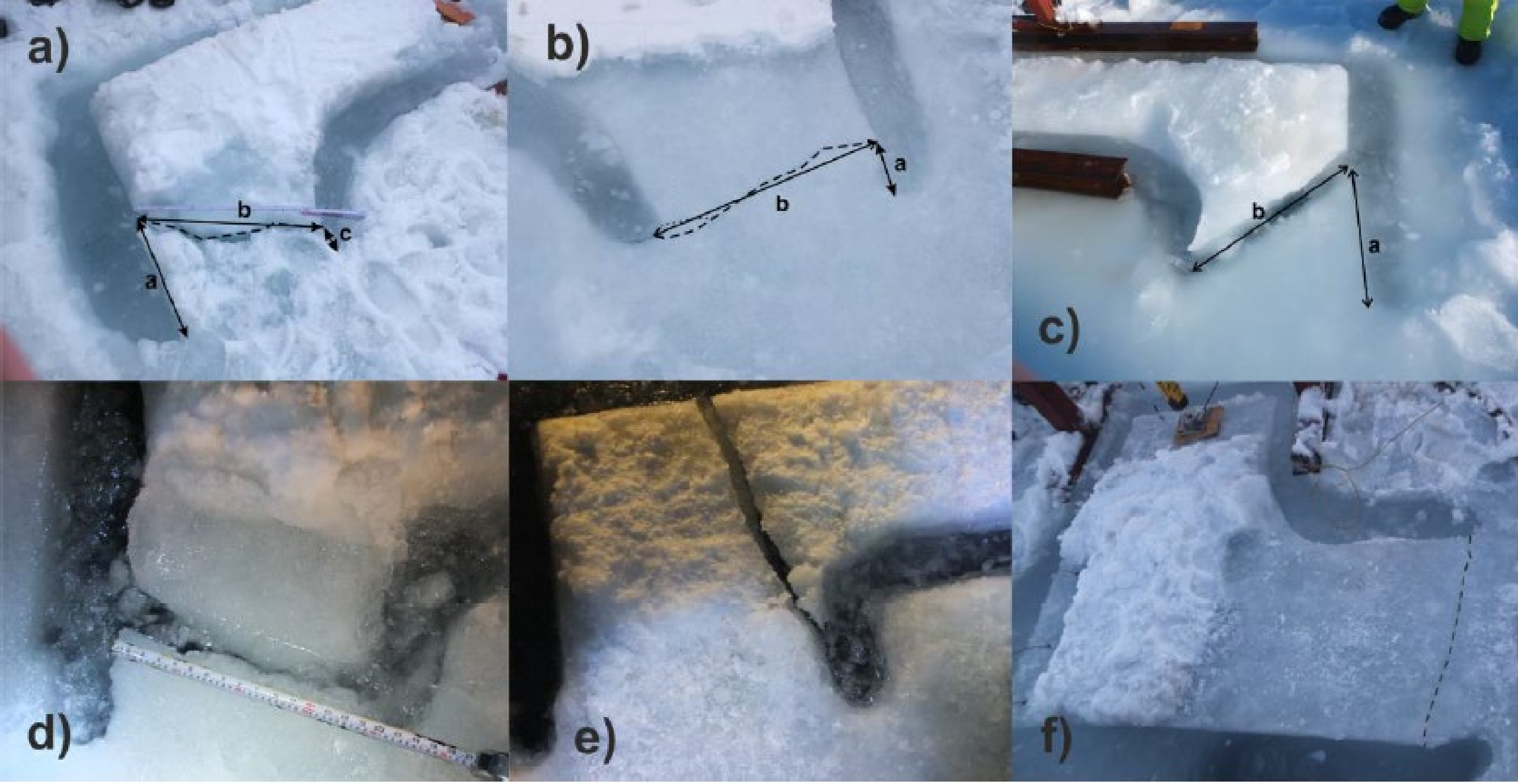


Figure 3. L-shaped beam fractures.

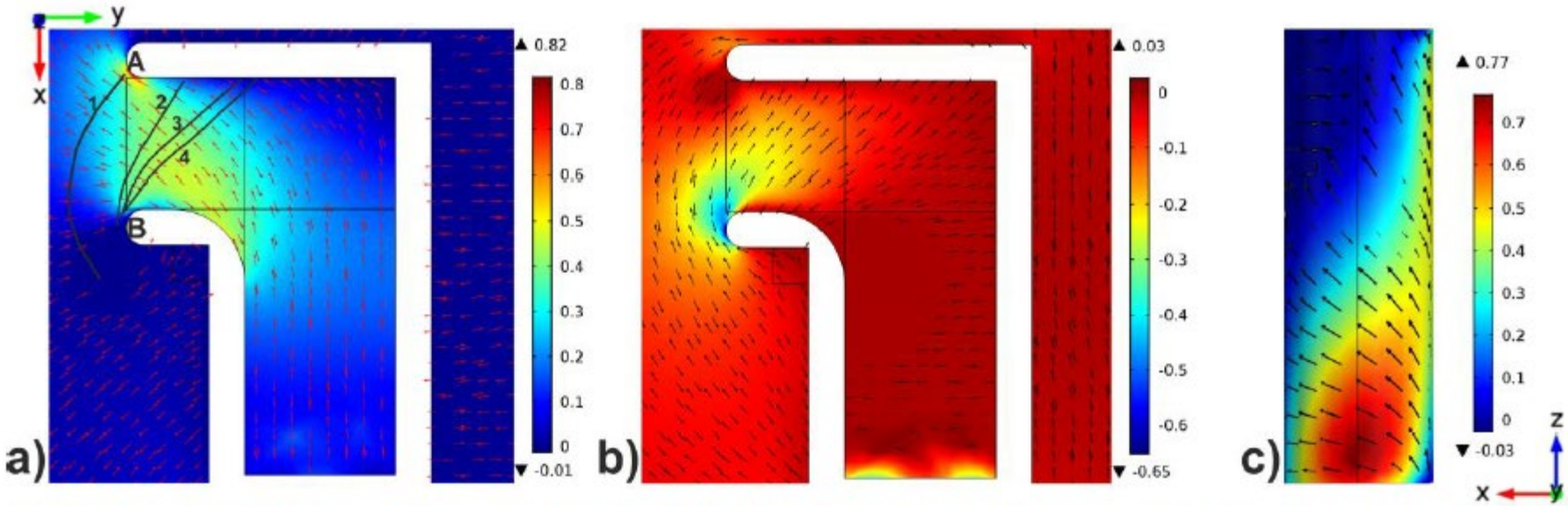


Figure 4. Distribution of the first (a) and third (b) principal stresses over the beam top surface; distribution of the first principal stress over the vertical surface of the rounding B (c)

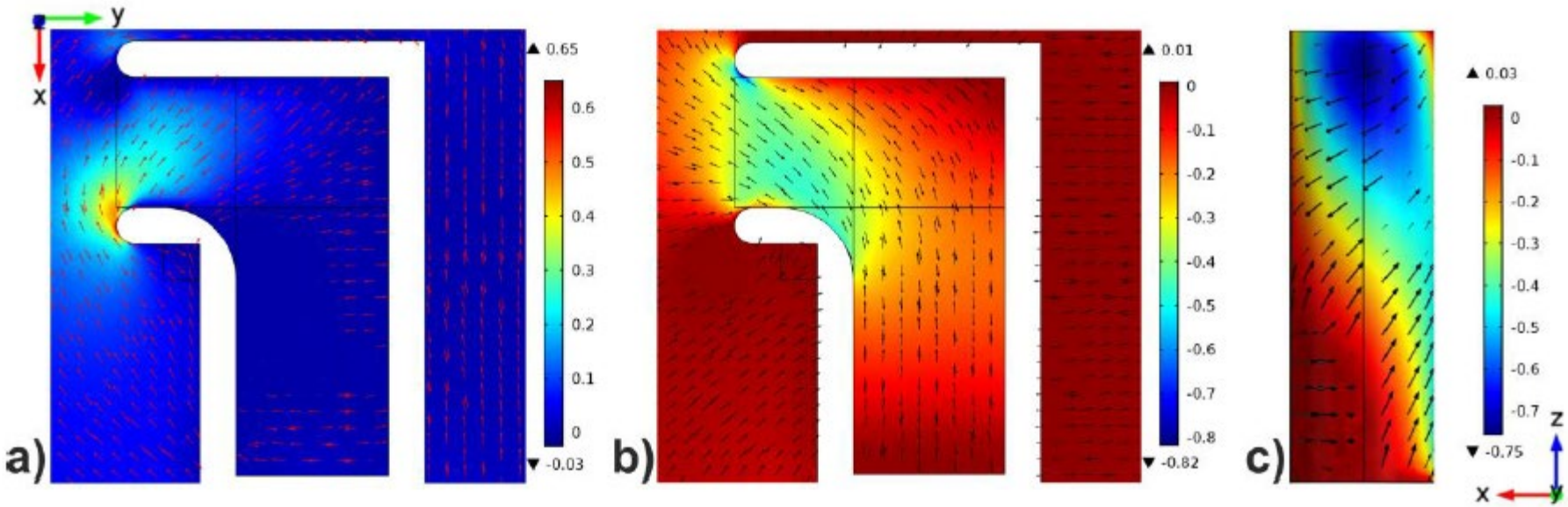


Figure 5. Distribution of the first (a) and third (b) principal stresses over the beam bottom surface; distribution of the third principal stress over the vertical surface of the rounding B (c)

1st principal stress

2nd principal stress

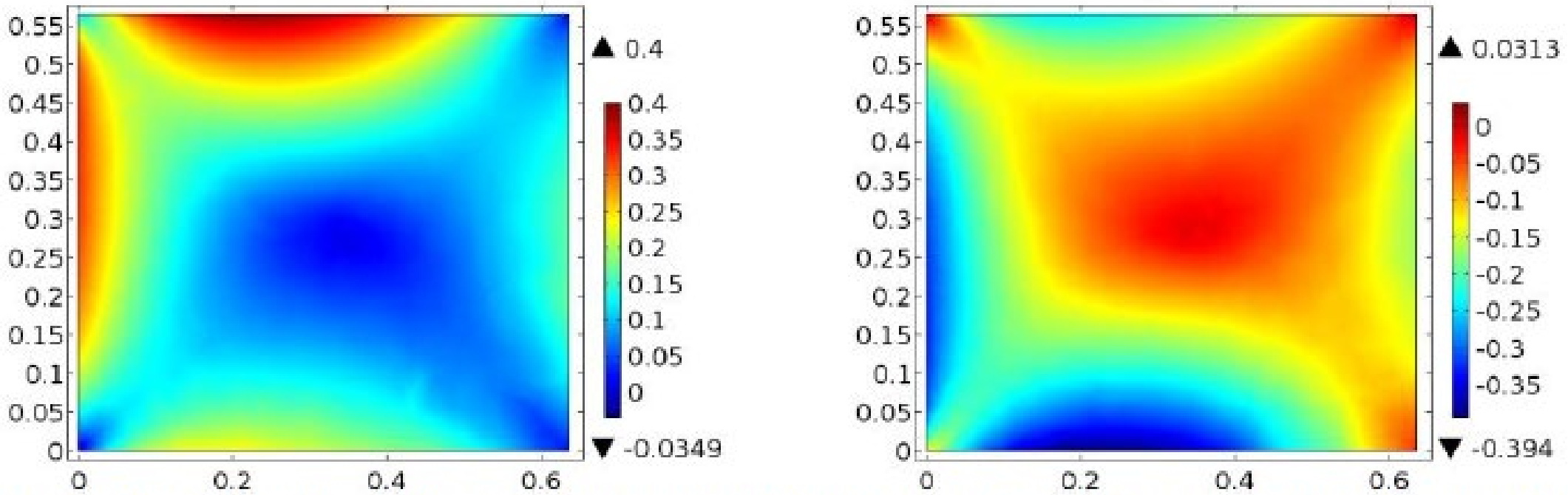


Figure 6. Distribution of first (a) and third (b) principal stresses along the crack plane.

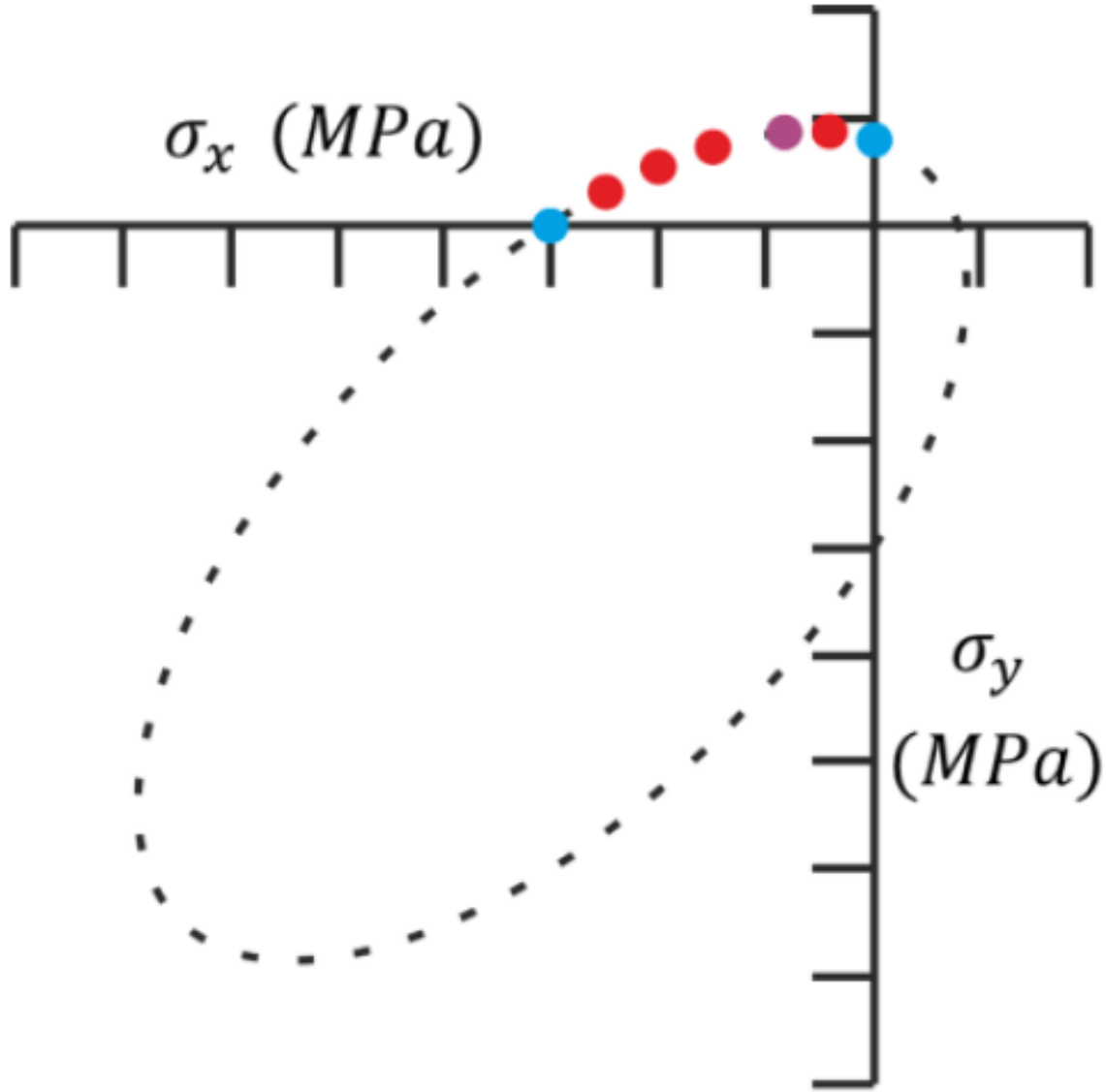


Figure 7. Failure envelope.

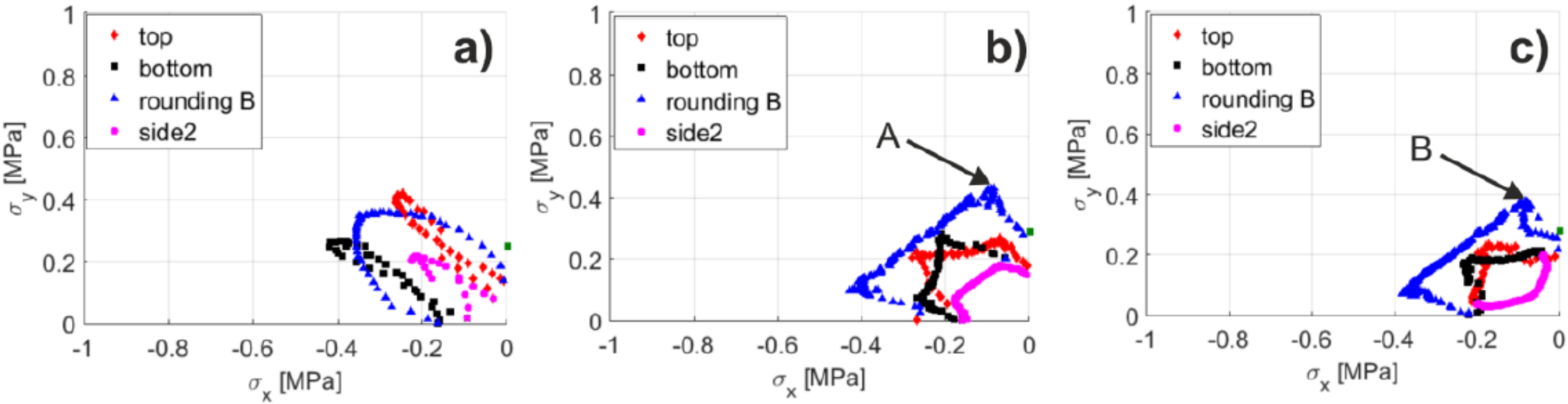


Figure 8. Principal stress distribution along failure edges.

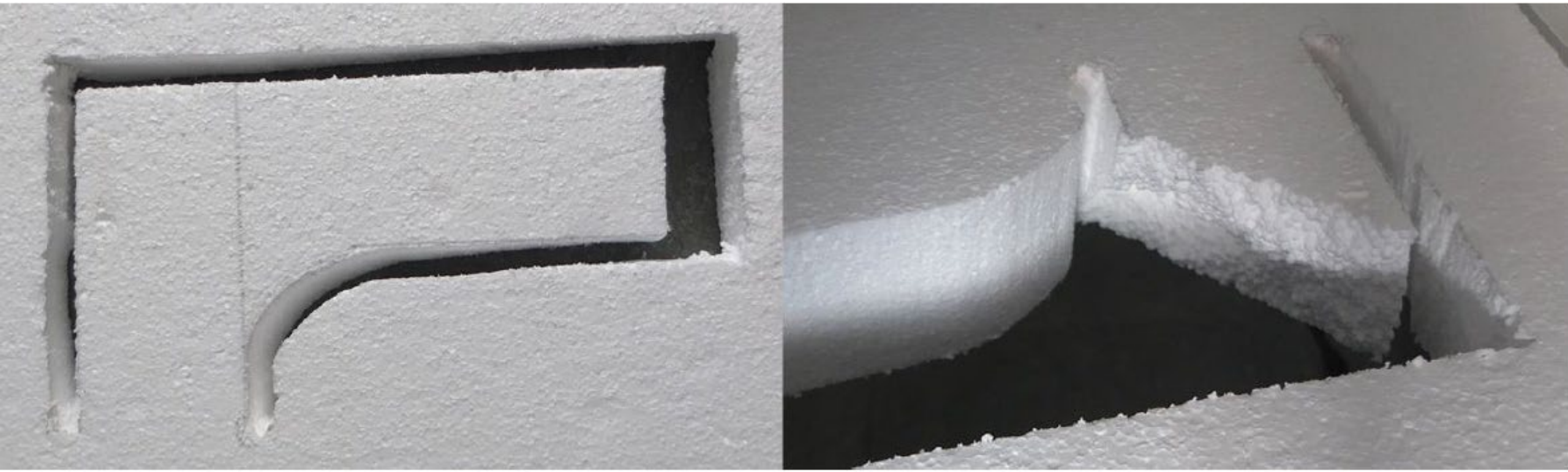


Figure 9. L-shaped beam from foam plastic before and after failure.

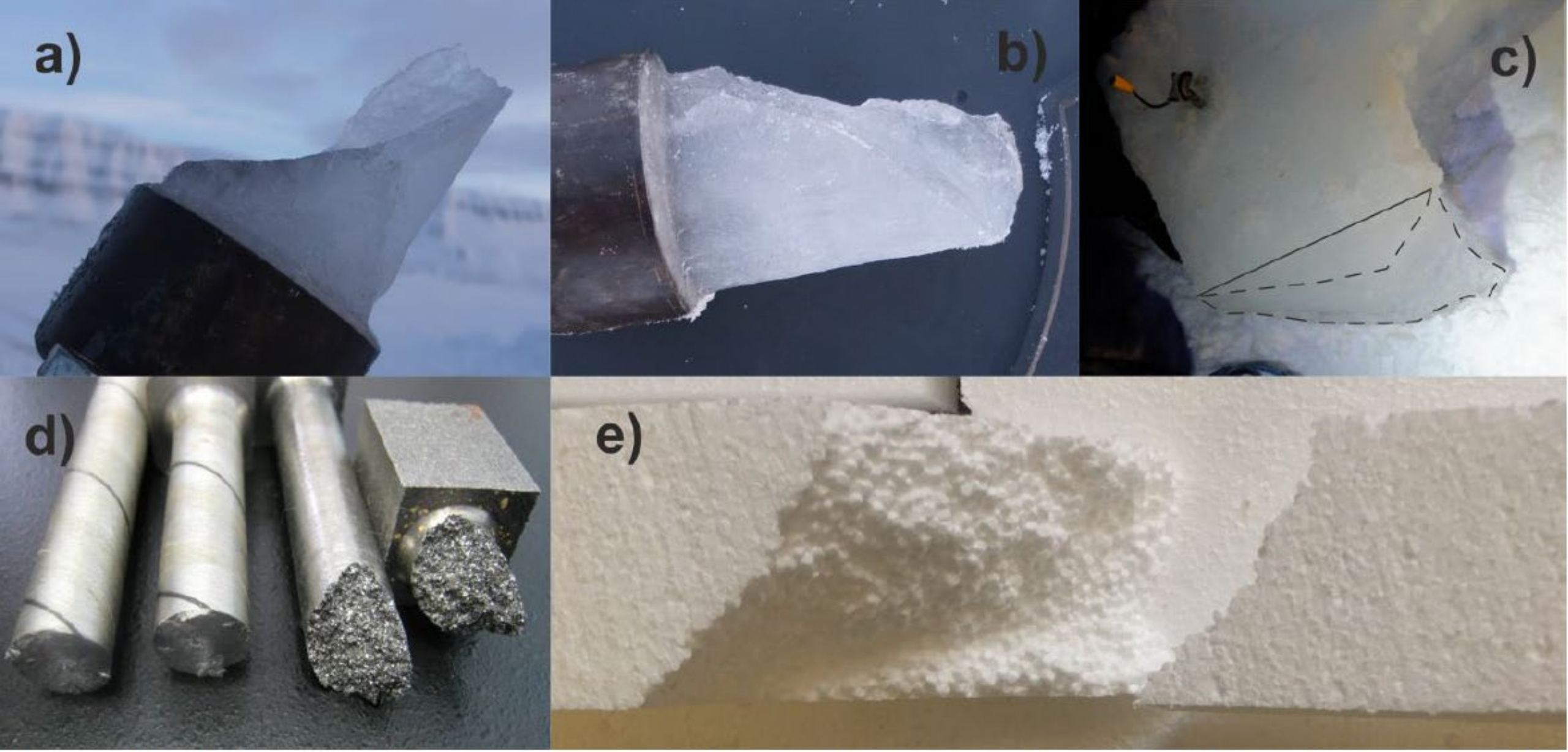
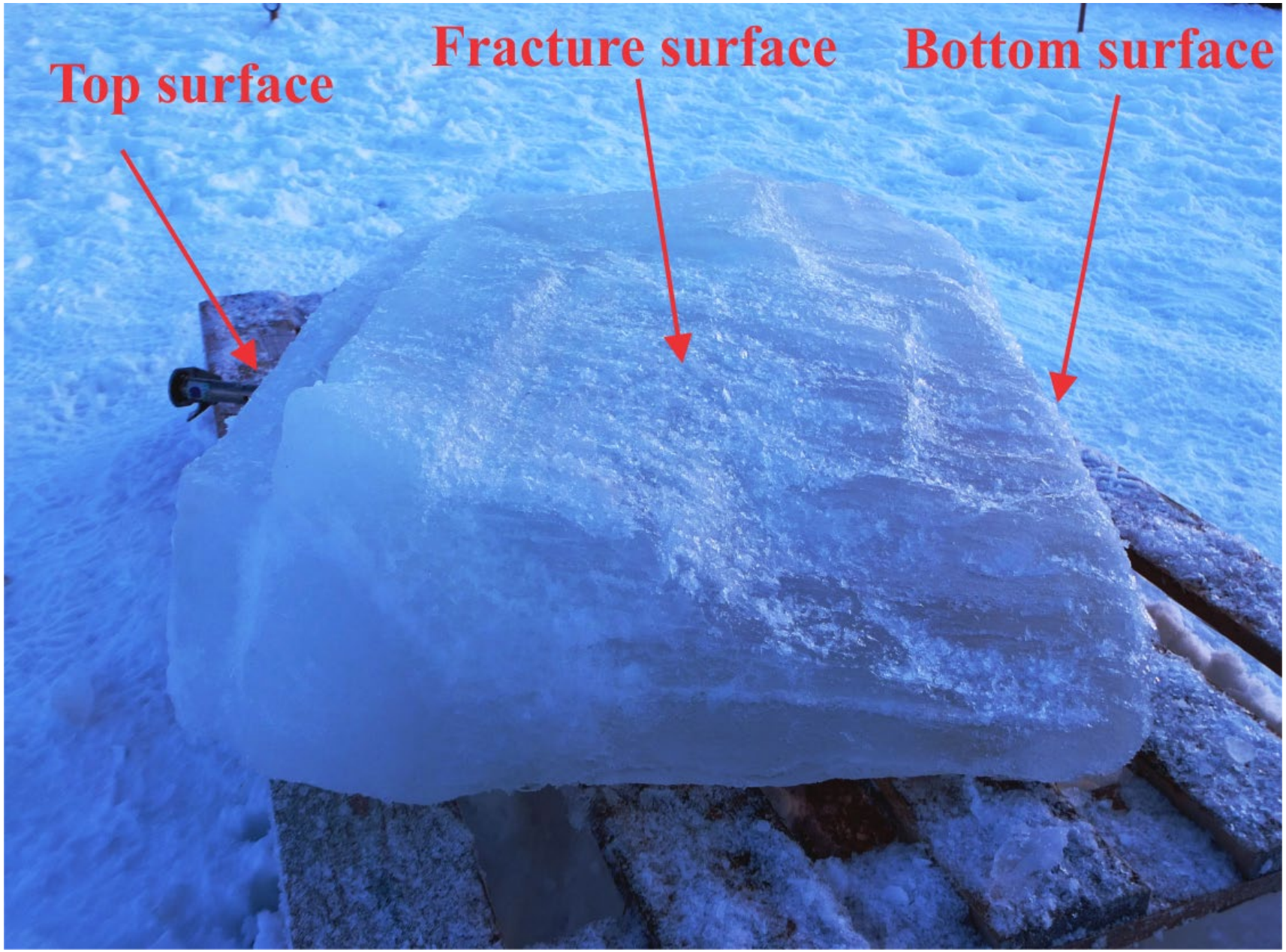


Figure 10. Failure patterns during torsion of ice (a,b,c), steel (d on the left), cast iron (d on the right) and foam plastic (e)


Top surface
Fracture surface
Bottom surface

Thank you for your attention!