

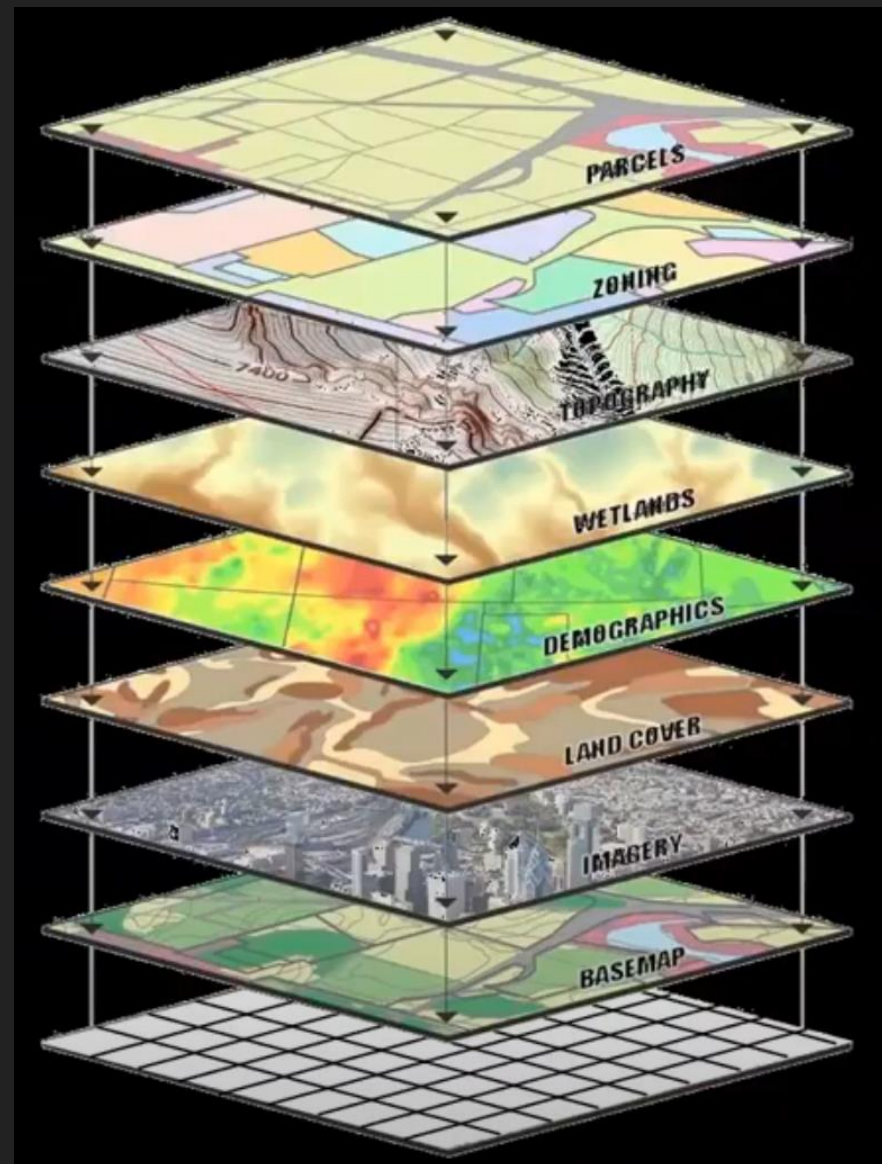
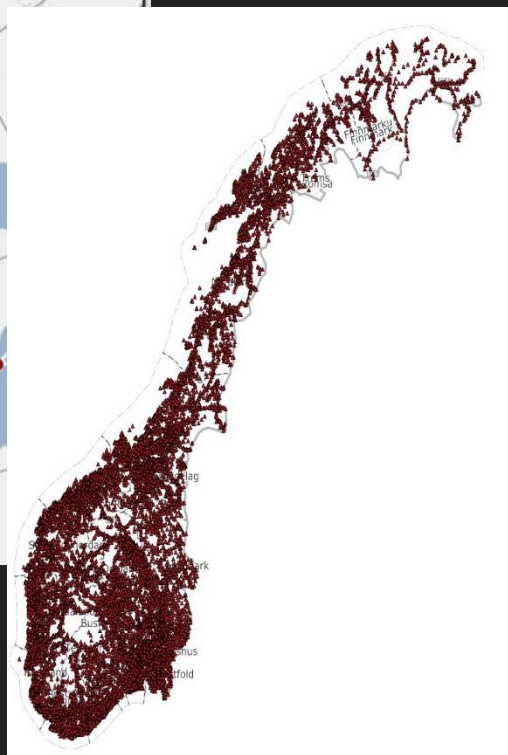
The Need for Enhanced Focus on Geodetic Reference Frames to Meet the Future Demands of Geospatial Data Management

Eurogeographics, Riga, May 2025





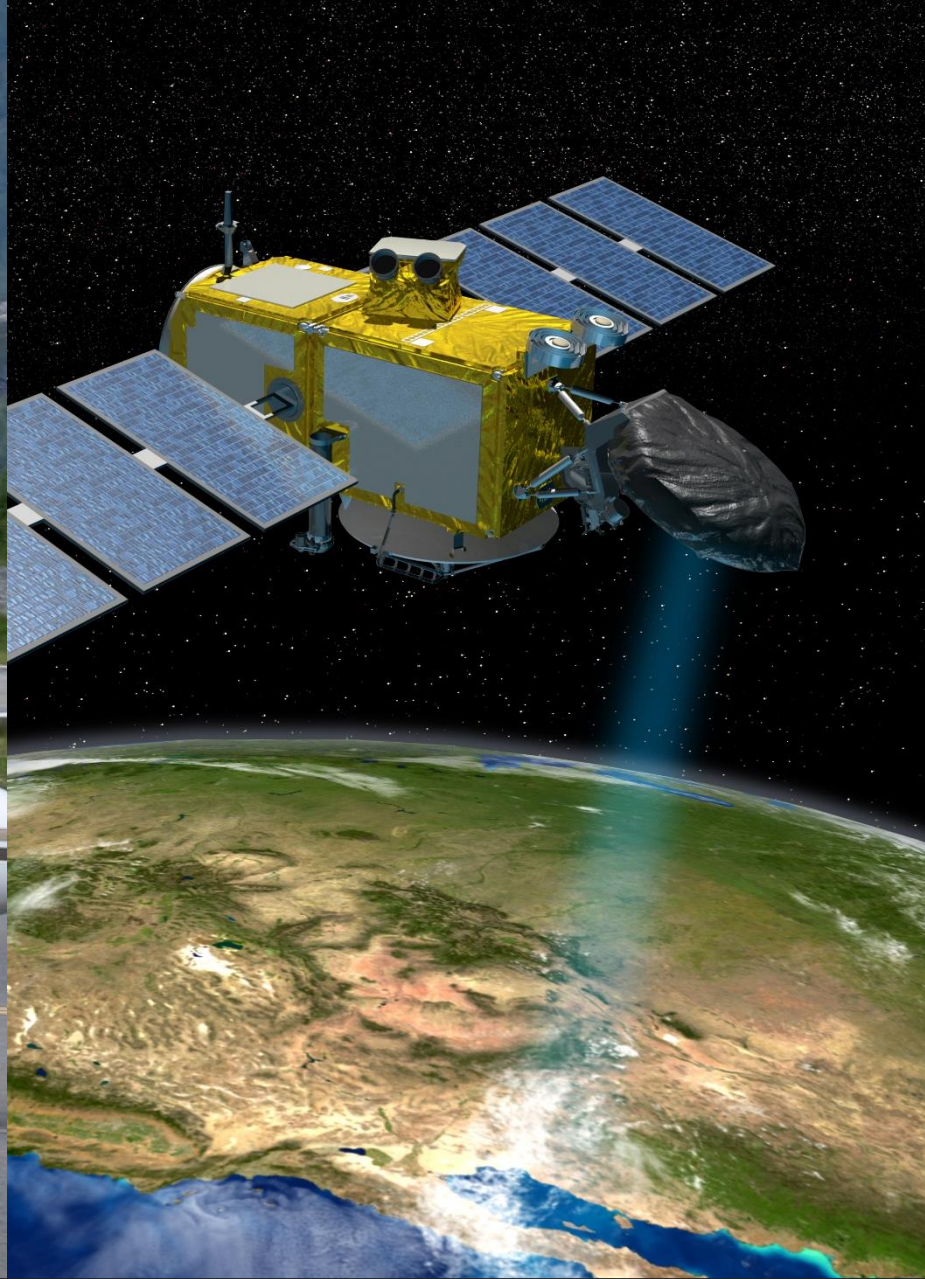
The geodetic reference frame



Geodetisk referanseramme

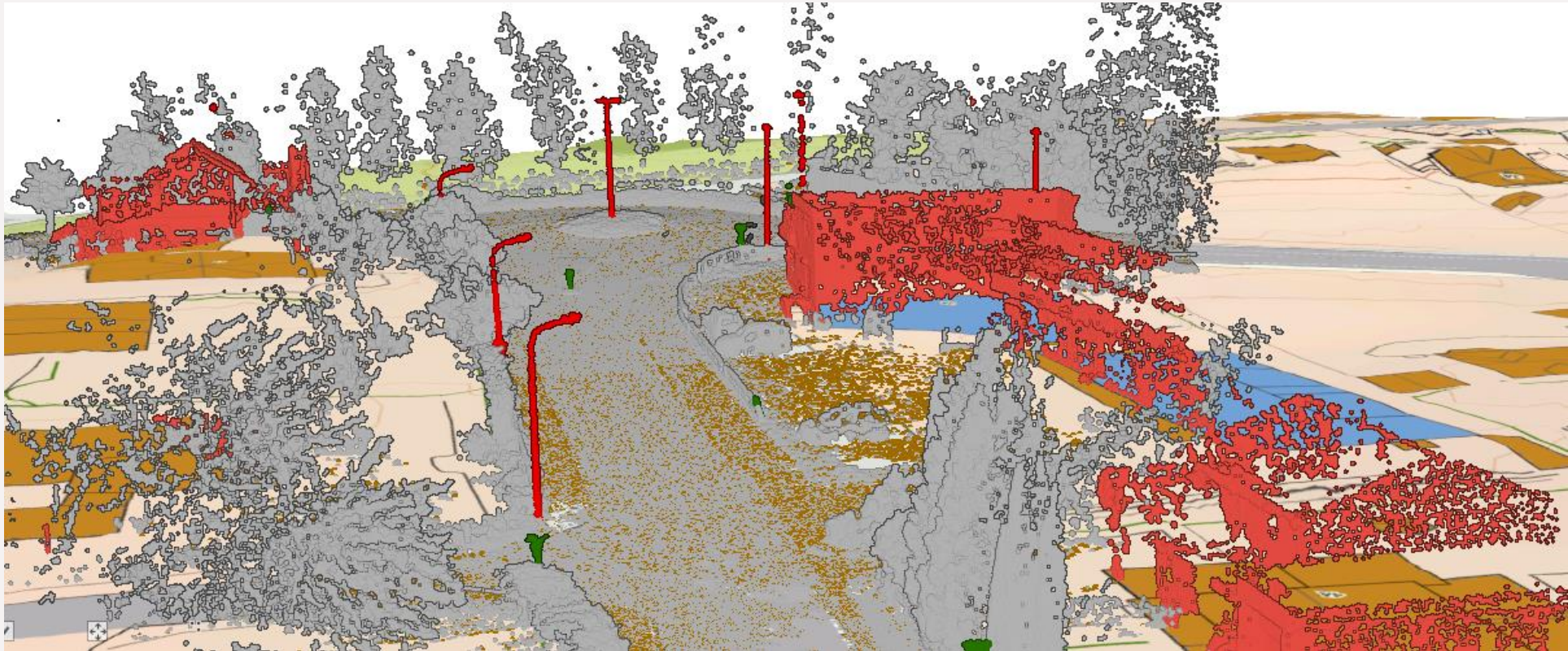


From land surveying to space geodesy and satellite navigation



"From field surveys and aerial photography to satellite imagery and crowdsourcing."

Crowdsourcing



The global geodetic reference frame

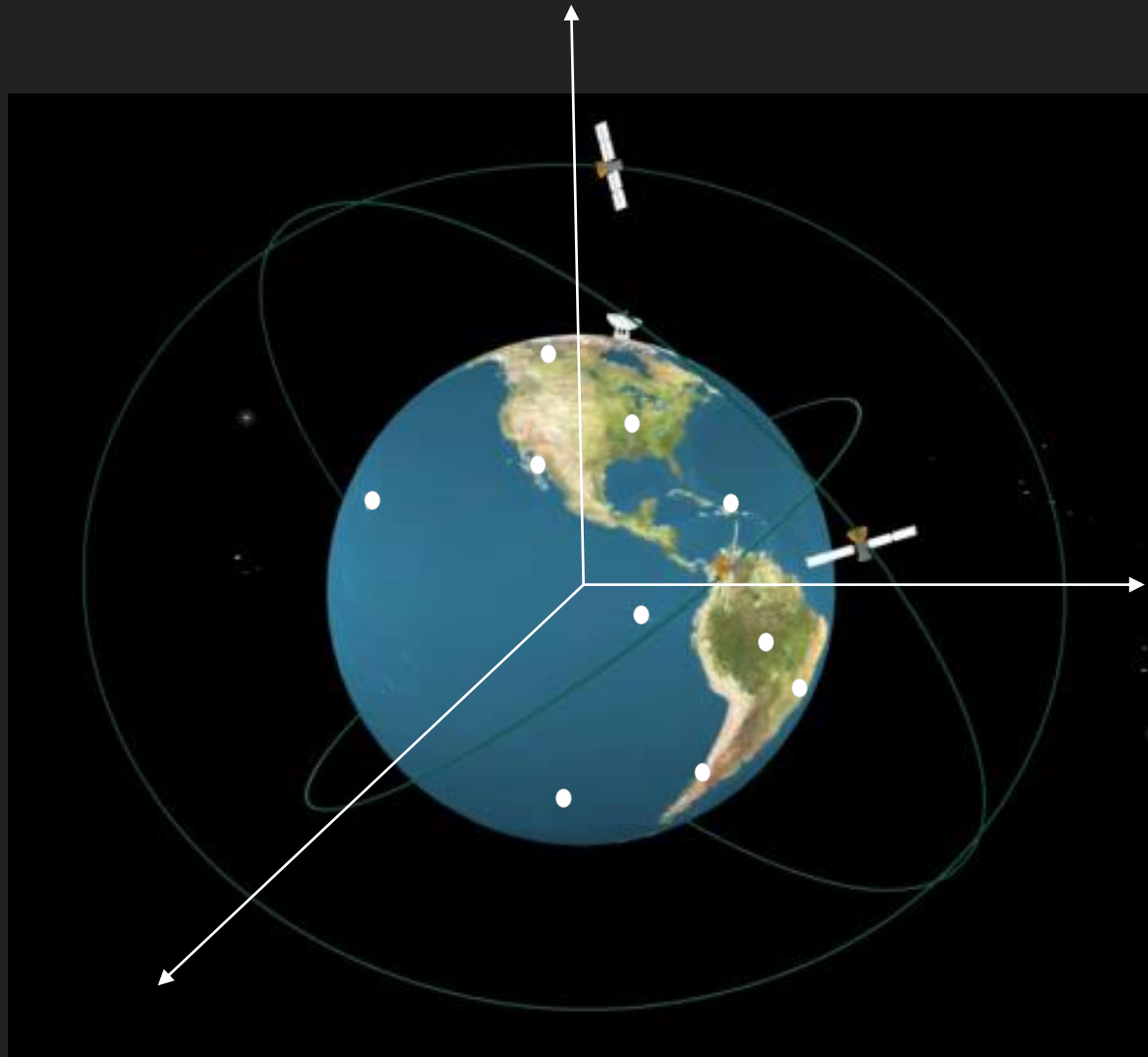
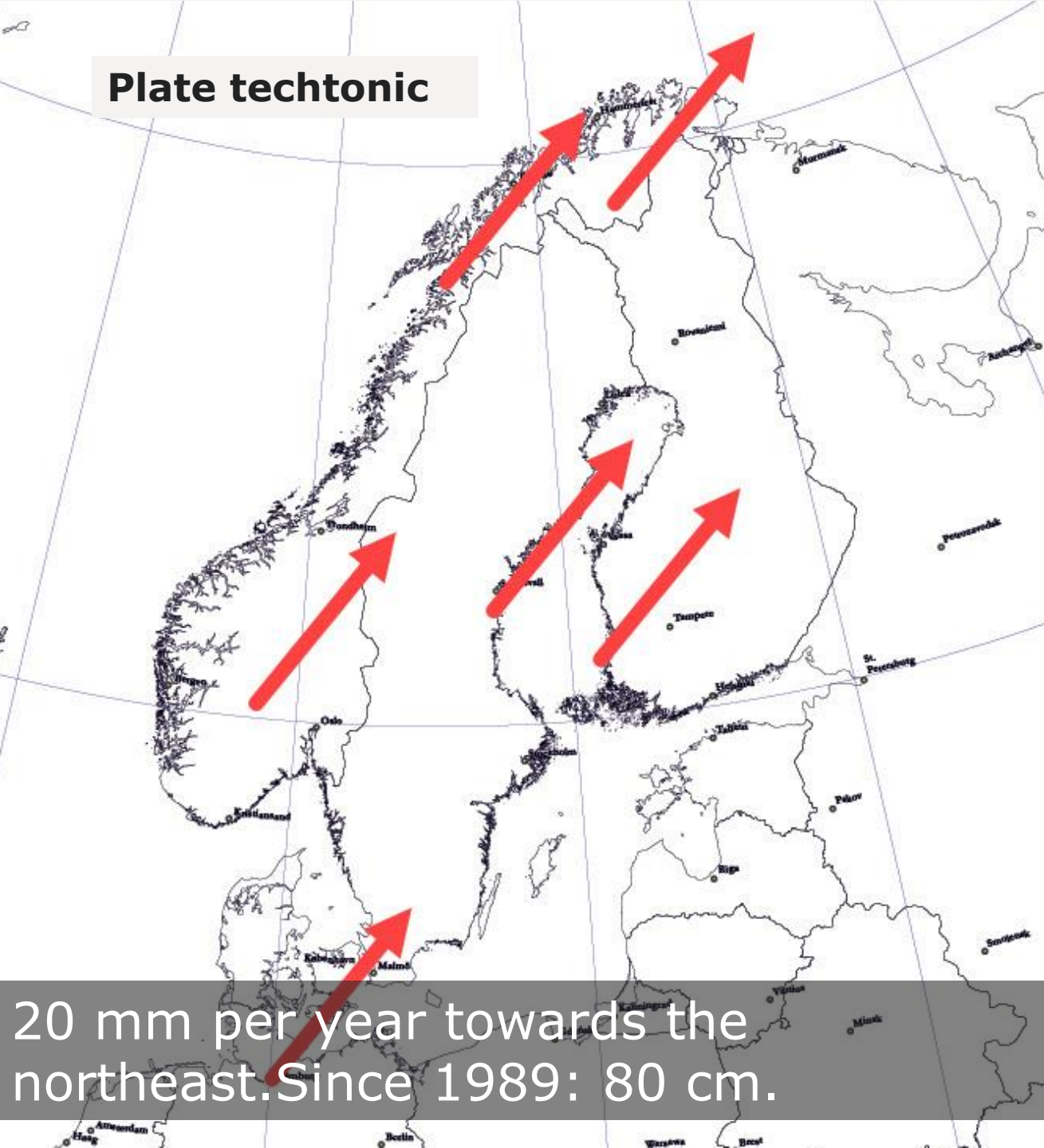




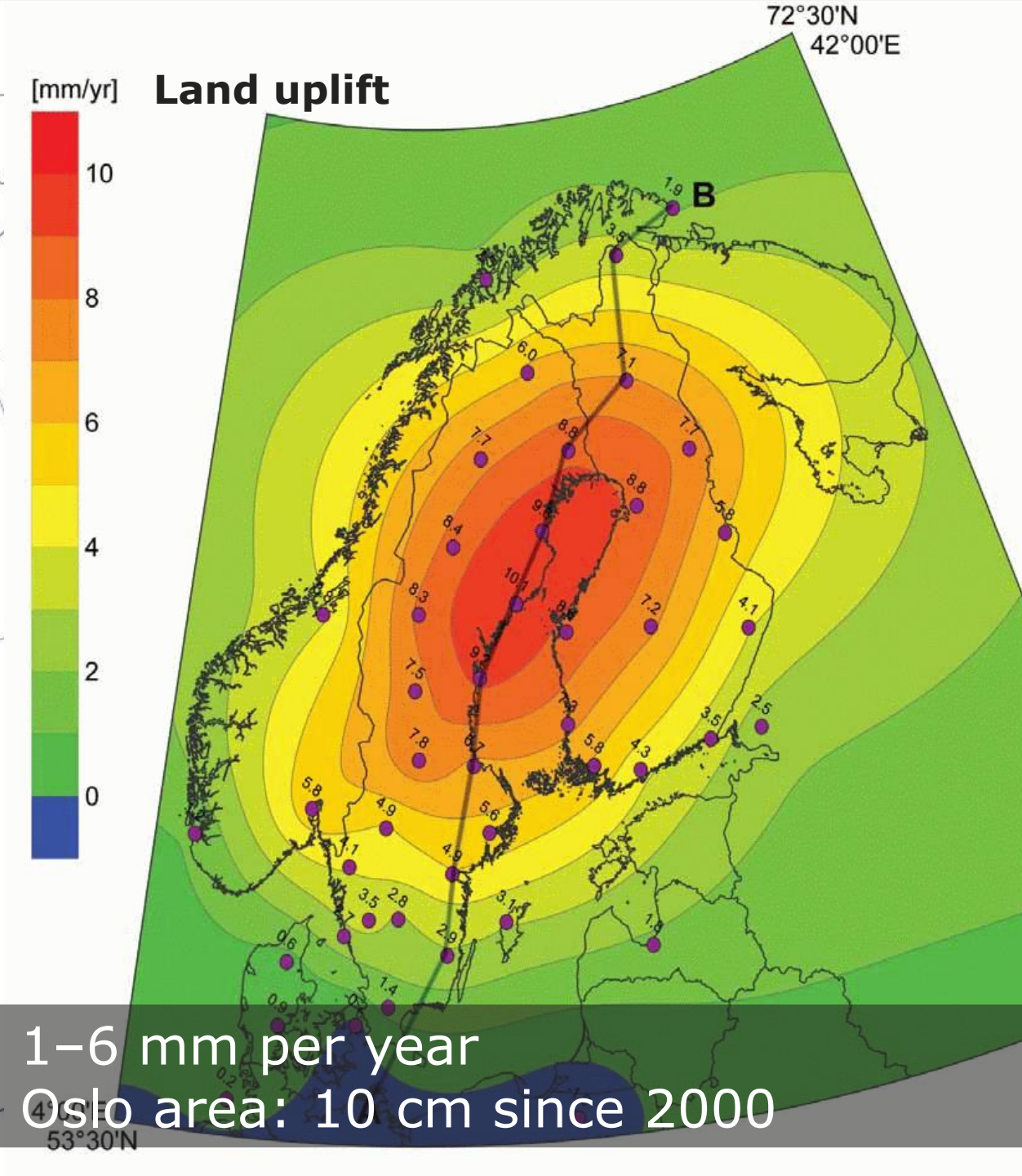
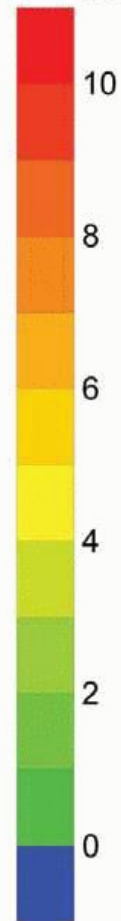
Plate techtonic



20 mm per year towards the northeast. Since 1989: 80 cm.

[mm/yr]

Land uplift



1–6 mm per year
Oslo area: 10 cm since 2000

Geodetic Reference frames

The relationship between ITRF, WGS84, and EUREF89

Date	Realizations of ITRS (dynamic)	ITRF frame epoch	Realizations of WGS 84 (dynamic)	Realizations of Euref89 (static)
1984			WGS 84 (Transit)	
1985			Offset from ITRF	
1986				
1987				
1988				
1989	ITRF88	1988.0		Euref89 =ITRF94 @ 1989.0
1990	:			
1991	ITRF92	1988.0		
1992	:		WGS 84 (G730)	
1993			≈ ITRF92 @ 1994.0	
1994	ITRF94	1993.0		
1995	:		WGS 84 (G873)	
1995			≈ ITRF94 @ 1997.0	
1997	ITRF97	1997.0		
1998				
1999				
2000				
2001			WGS 84 (G1150)	
2002	ITRF2000	1997.0	≈ ITRF2000 @ 2001.0	
2003				
2004				
2005				
2006	ITRF2005	2000.0		
2007				
2008			WGS 84 (G1674)	
2009	ITRF2008	2005.0	≈ ITRF2008 @ 2005.0	
2010			WGS 84 (G1762)	
2011			≈ ITRF2008 @ 2005.0 **	
2012			(adjusted to ITRF annually)	
2013				
2014	ITRF2014	2010.0		
2015				
2016				
2017				
2018				
2019				
2020			WGS 2020 ??	ITRFxx @ yyyy.yy
2021	ITRF2020	?		
2022				
2023				
2024				
2025				

There are time-dependent transformations between the realizations of ITRS

Recommendations - long term

Multi-Reference Frame Support: Future geospatial systems, both shared and user applications, must support multiple reference frames simultaneously to ensure compatibility across datasets.

Automatic Updates: Data systems should automatically update when reference frames are changed or updated, minimizing disruptions in map data accuracy.

Seamless Reference Frame Switching: Switching between reference frames should be simplified and automated, avoiding the need for complex, manual processes.

EUREF is responsible for the realization of the regional European reference frames. However, there may be a need for further encouragement to facilitate the transition towards global reference frames in Europe. This would enable position data from satellite systems such as Galileo and GPS to increasingly align with European geospatial databases.