

**Section for Forecast of Flood and Landslide hazards
Hydrology department, NVE**

Welcome to Oslo!



Idea of the workshop



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Natural Hazards
 and Earth System
 Sciences



- 1 Brasil, Rio de Janeiro; Ortiago et al., 2001.
- 2 Colombia, Combeima valley; Huggel et al., 2010.
- 3 USA, Southern California; NOAA-USGS, 2005.
- 4 USA, San Francisco Bay; Keefer et al., 1987.
- 5 USA, Seattle WA; Chleborad et al., 2008.
- 6 Canada, North Vancouver; Jakob et al., 2012.
- 7 Canada, British Columbia; Jakob et al., 2006.
- 8 UK, West Dorset; Cole and Davis, 2002.
- 9 Italy, Nais; Egger and Mair, 2009.
- 10 Italy, Dolomites; Bacchini and Zannoni, 2003.
- 11 Italy, Piedmont region; Capparelli and Tiranti, 2010.
- 12 Italy, Tuscany; Segoni et al., 2014.
- 13 Italy, Torgiovanetto; Intieri et al., 2012.
- 14 Japan, Nojiri River Basin, Itakura et al., 1997.
- 15 Taiwan, entire island; Chen, 2005.
- 16 Taiwan, Xinsan-bridge basin; Chang, 2003.
- 17 China, Hong Kong; Chan and Pun, 2004.
- 18 Indonesia, Banjarnegara; Honda et al., 2008.
- 19 Australia, Wollongong; Fientje et al., 2005.
- 20 Switzerland, Susten; Badoux et al., 2009.
- 21 Switzerland, Preonzo; Loew et al., 2012.
- 22 Switzerland, Guttannen; Tobler et al., 2012.

Monitoring and prediction in early warning systems for rapid mass movements

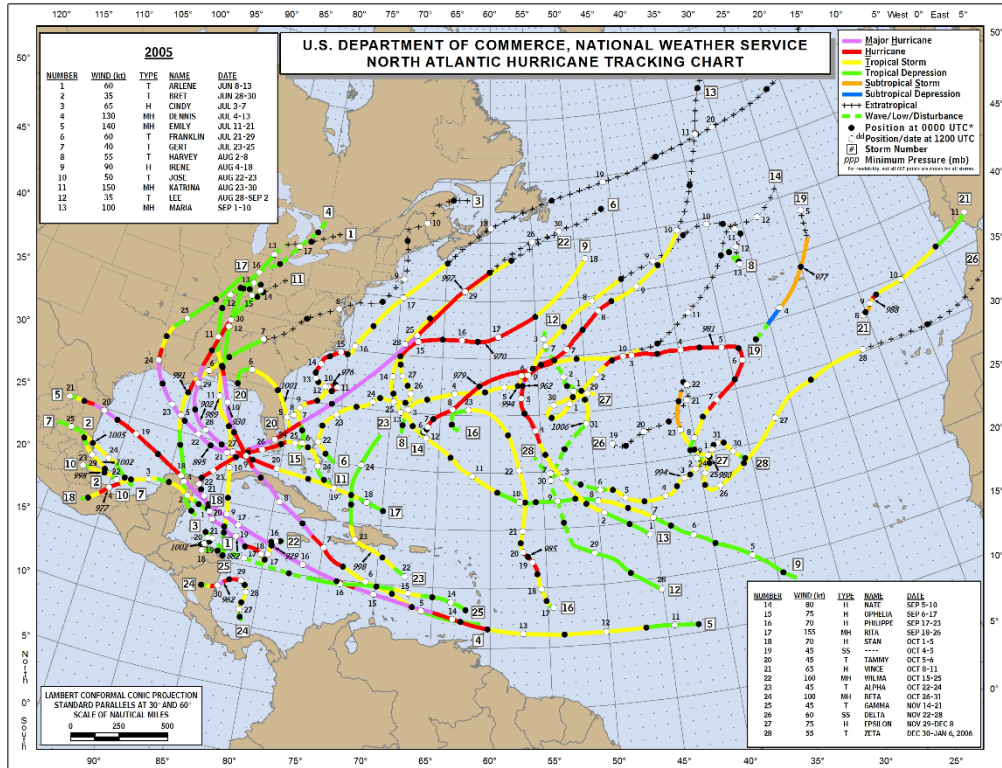
M. Stähli¹, M. Sättele², C. Huggel³, B. W. Mc Ardell¹, P. Lehmann⁴, A. Van Herwijnen², A. Berne⁵, M. Schleiss^{5,*}, A. Ferrari⁶, A. Kos^{7,**}, D. Or⁴, and S. M. Springman⁷

- 2011 – overview of landslide EWS in other countries (Presentation for the Conference organized by the Norwegian Public Roads Administration (NPRA)-Teknologidagene)
- 2014 –discuss briefly the idea with Fausto Guzzetti from CNR-IRPI, Italy and later with Helen Reeves from BGS, UK
- 2015 - following article from *Stähli et al 2015*

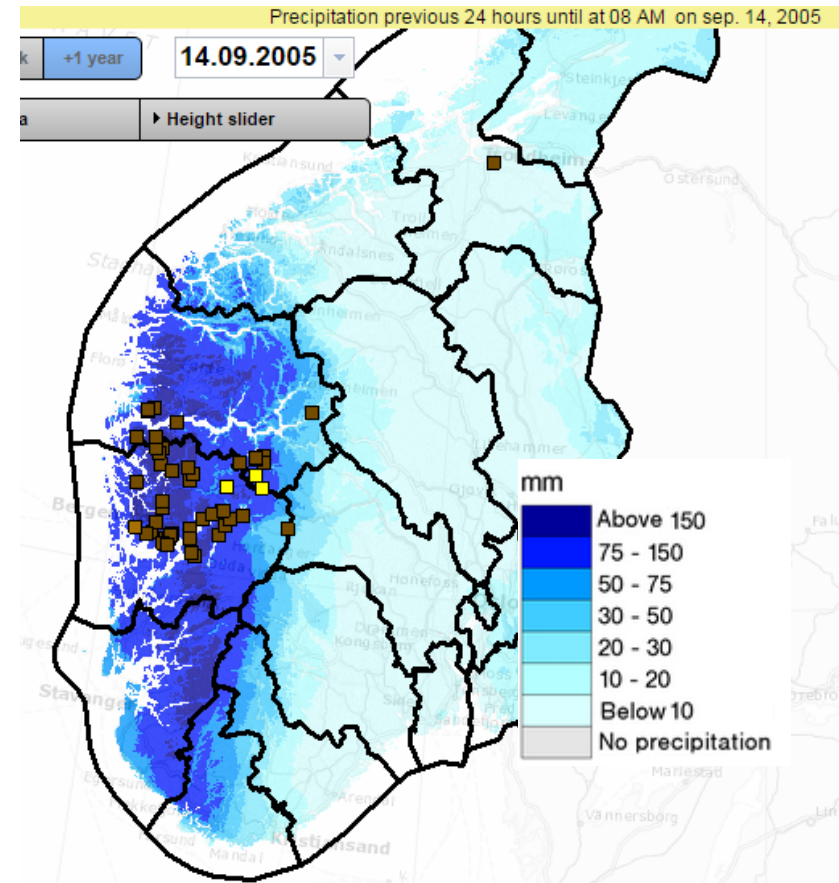
Purpose of the workshop

- Overview of countries and institutions that work with operational EWS at national/regional level
- To gather international experts, but focusing on the multi-disciplinarity (landslide prevention requires multidisciplinary team, more than other natural hazards)
- To exchange experiences and knowledge regarding methods, models, data used in daily warning evaluations, as well as to discuss operating practices and communication procedures
- To create a future network of international experts in rainfall- (and snowmelt) induced landslides.
- Better interaction between meteorological, flood and landslide forecasting services on national/regional level.

Why we need a international collaboration?



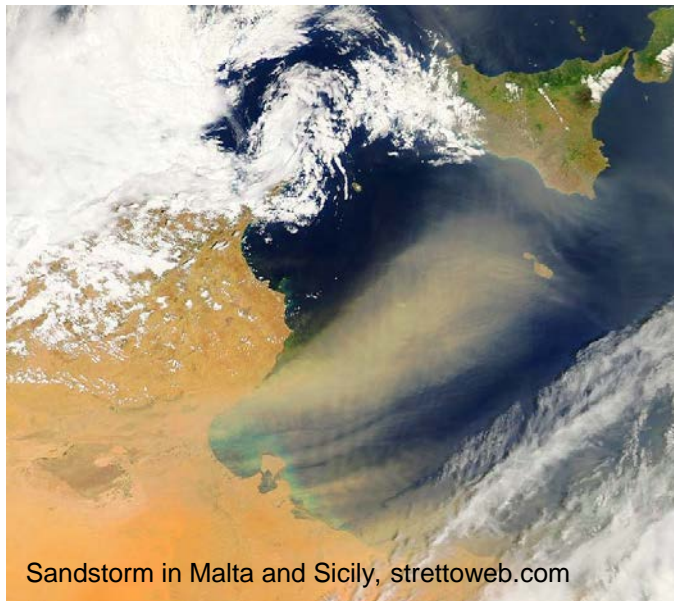
Rests of Hurricanes Maria and Nate, (Kristin), 14 sept. 2005 Norway



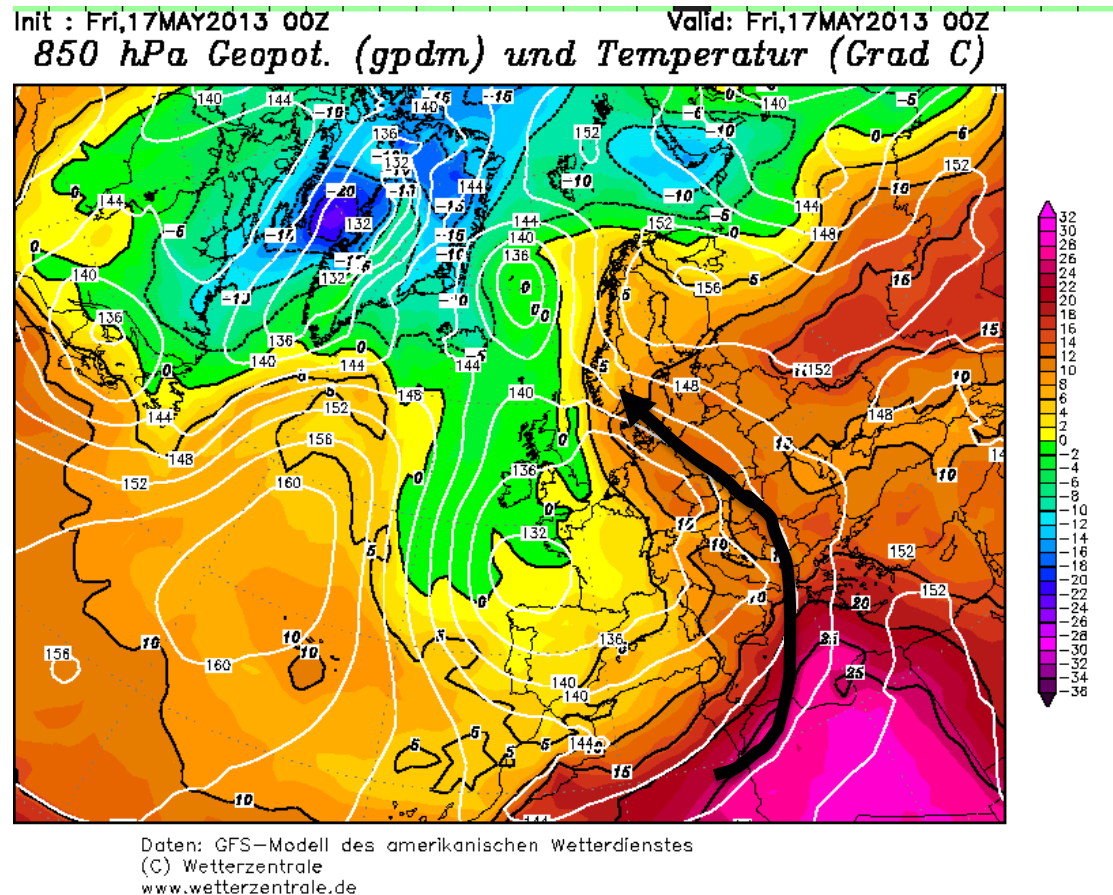
Many debris slides and debris flows in Western Norway. The debris slide at **Hatlestad**, Bergen, killed 3 people, 14 september 2005

How a sandstorm, strong wind, warm temperatures in southern Europe can trigger flood and landslides in Norway?

17-22 of May 2013



Sandstorm in Malta and Sicily, strettoweb.com





Enjoy your stay!