

FIG

# FIG WORKING WEEK 2017

Helsinki Finland

29 May - 2 June 2017

*Presented at the FIG Working Week 2017,  
May 29 - June 2, 2017 in Helsinki, Finland*



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From digitalisation to augmented reality

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## Automatic Generation of Cartographic Features for Relief Presentation Based on LIDAR DEMs

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## The National Topographic Database (NTDB)

- NTDB will be a digital, uniform spatial data reserve for Finland that meets the modern user requirements
- Group of projects carried out in cooperation with municipalities, other public administration and the private sector
- Here the focus is on **automatic generation of topographic contour lines**



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## Why new topographic contours?

- Elevation reference system in Finland changed from N60 to N2000
- Web-map services set the need for multi-scale contours
- Enablers:
  - LIDAR data and NLS Elevation model 2m (NLS-DEM2) available from the whole country by 2019
  - Time to take the digital leap!



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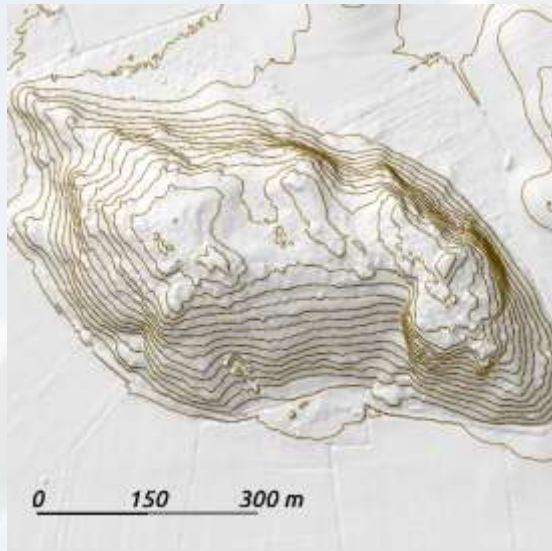
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## Contour lines from the NLS-DEM2

- Contours directly generated from high resolution DEMs, such as the NLS-DEM2 are overly detailed and jagged.





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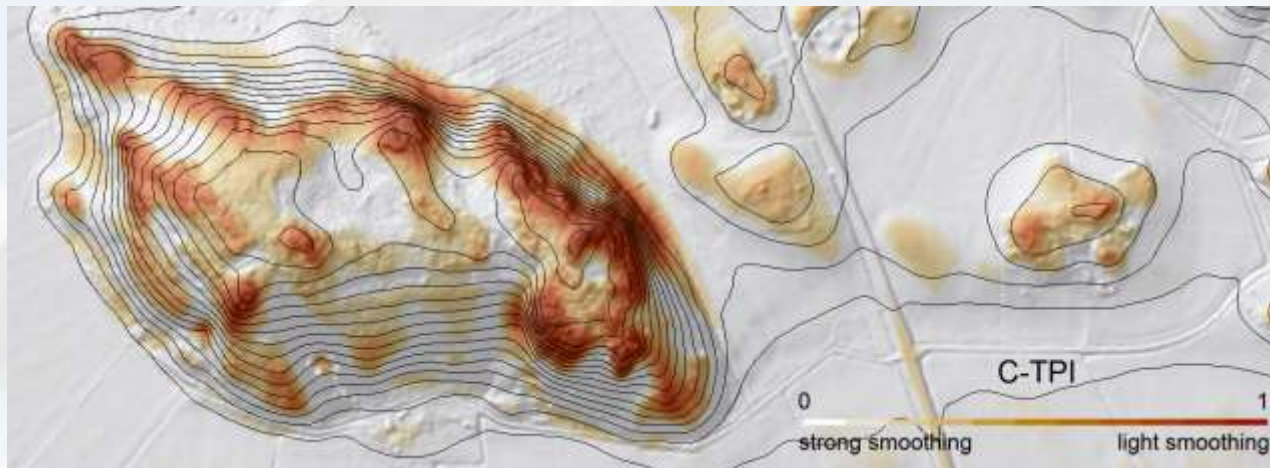
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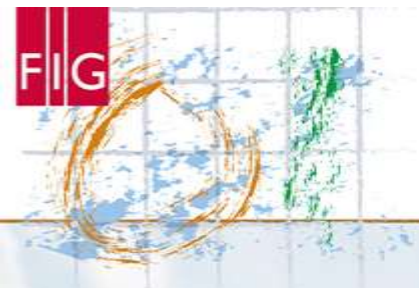
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## Topographic position index (TPI)

- TPI can be used as an indicator of the level of filtering needed at different locations in a DEM.
- TPI is the difference between the value of a point and the mean value of its neighbours in a given radius around it.





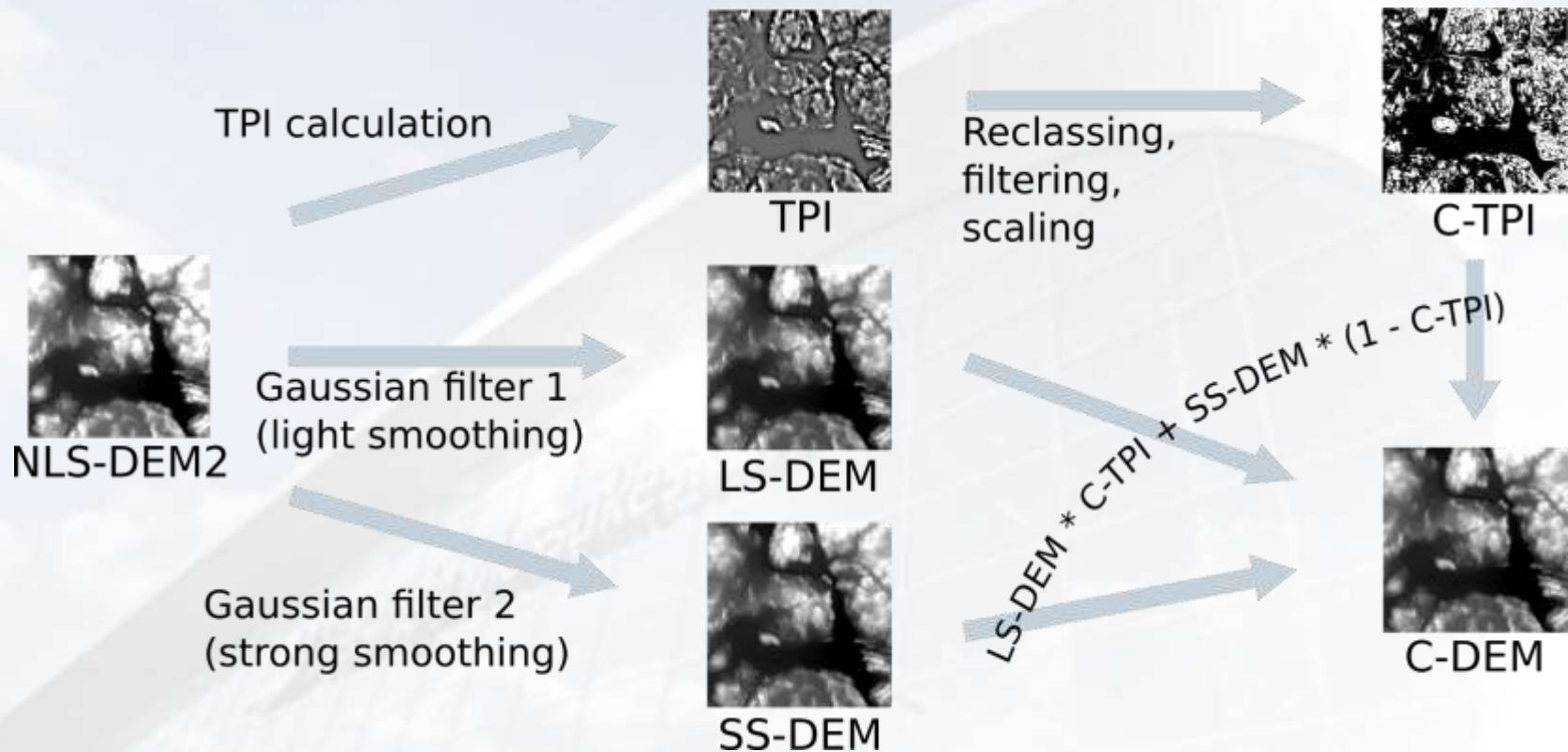
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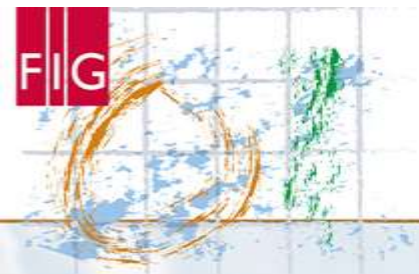
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## DEM smoothing process





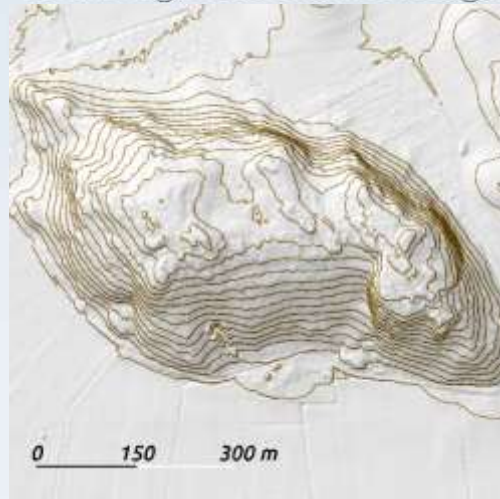
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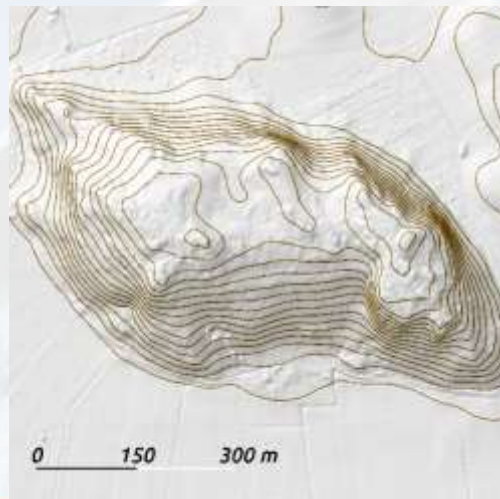
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Unfiltered



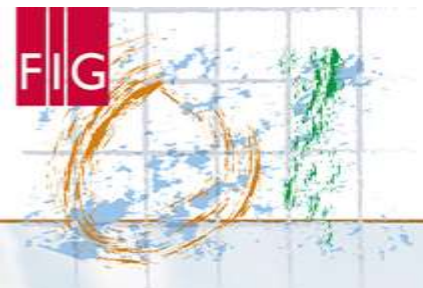
Filtered



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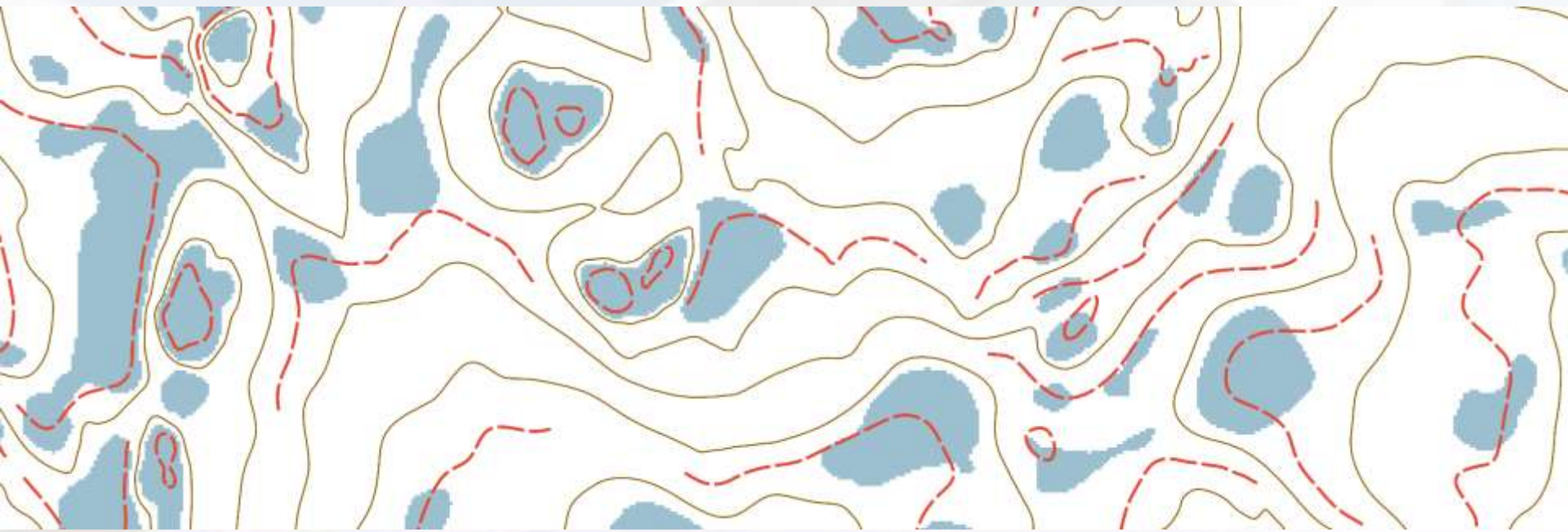
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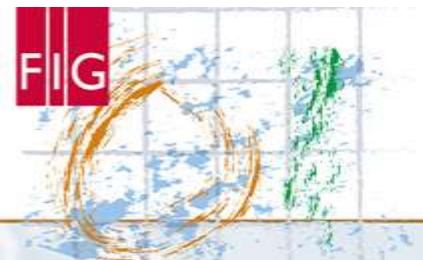
## Supplementary contours

- Supplementary contours are used only where surface forms between regular contours are unintuitive.



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Manual stereo-plotted contours  
(NLS TDB)

Our solution for automatically generated contours



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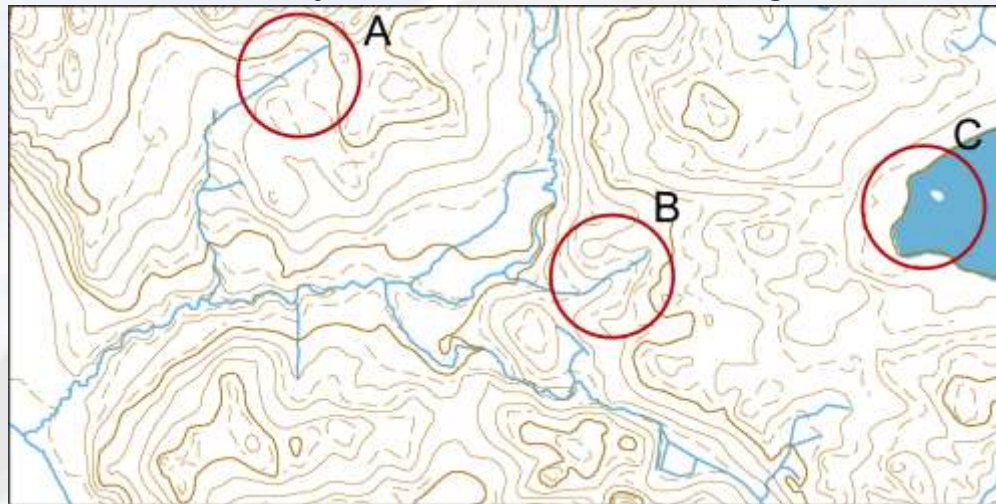
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## Remaining challenges

- Improving the C-TPI.
- Contour refinement with vector generalization.
- Consistency with other topographic features.



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## Thank you for your attention!

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