

MAMMU: an R package for GIS-based river terrace mapping, morphostratigraphic evaluation of terrace maps and outcrop data and river long profile modelling

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INTRODUCTION

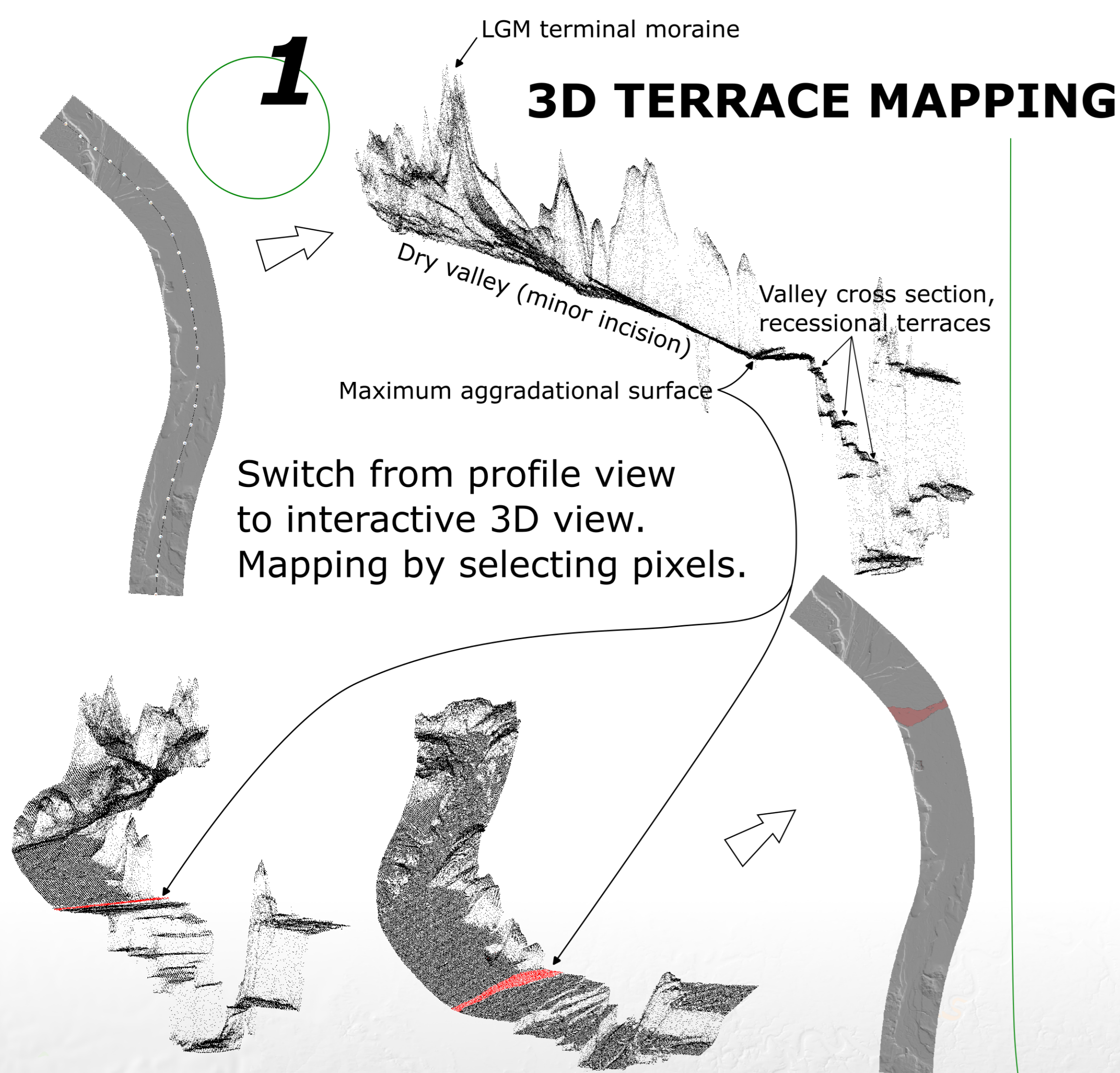
A toolset for R to apply morphostratigraphic methods on the basis of GIS data (raster/polygon/point).
Designed for a quick workflow (0. provide data - 1. draw line - 2. map - 3. model - 4. measure).

Visualization method highlights morphologic flats.

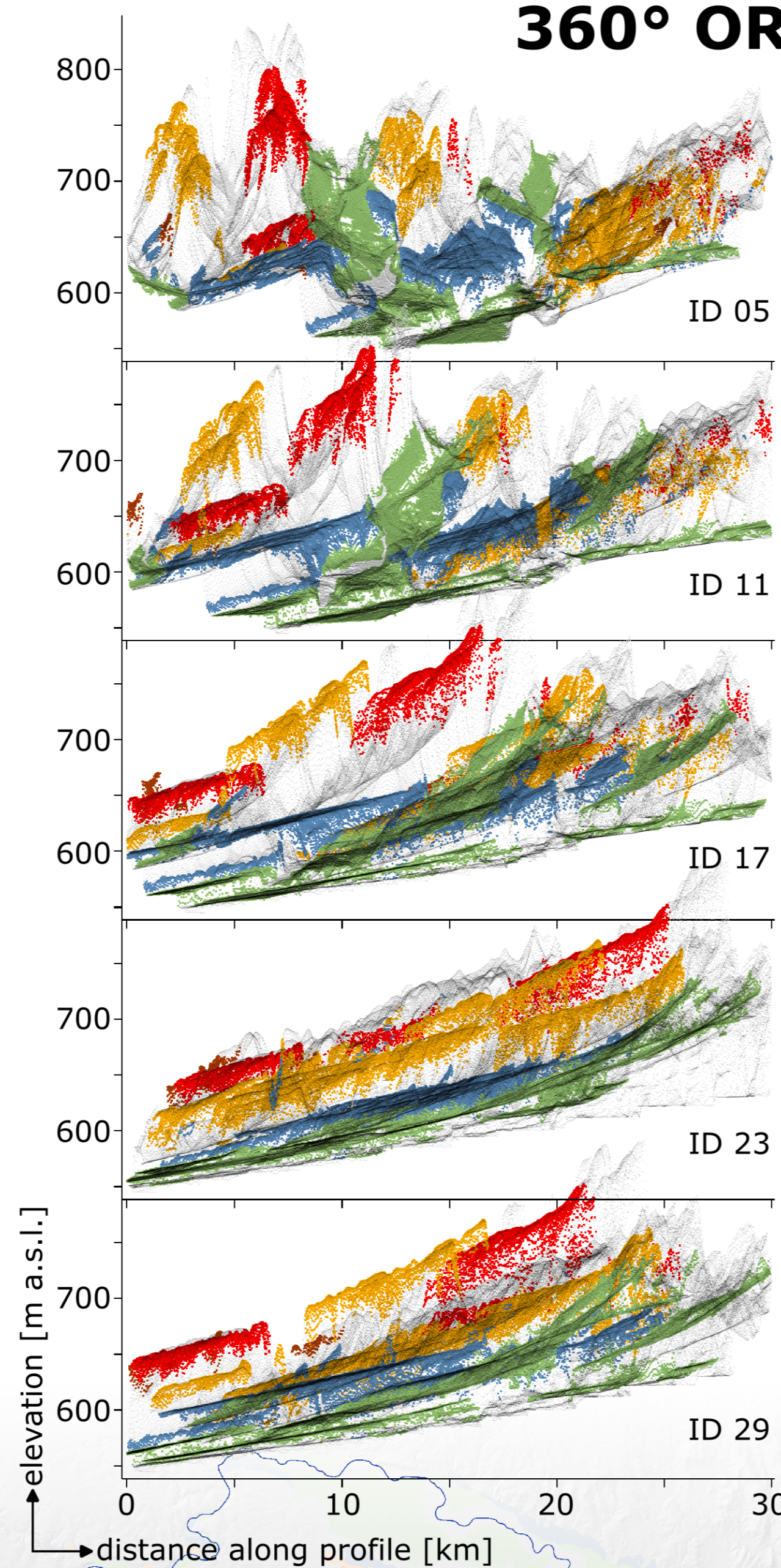
Useful for

(terrace) mapping from scratch,
modelling river long profiles (measure slope, elevation),
testing terrace stratigraphy.

Package will be online this summer.

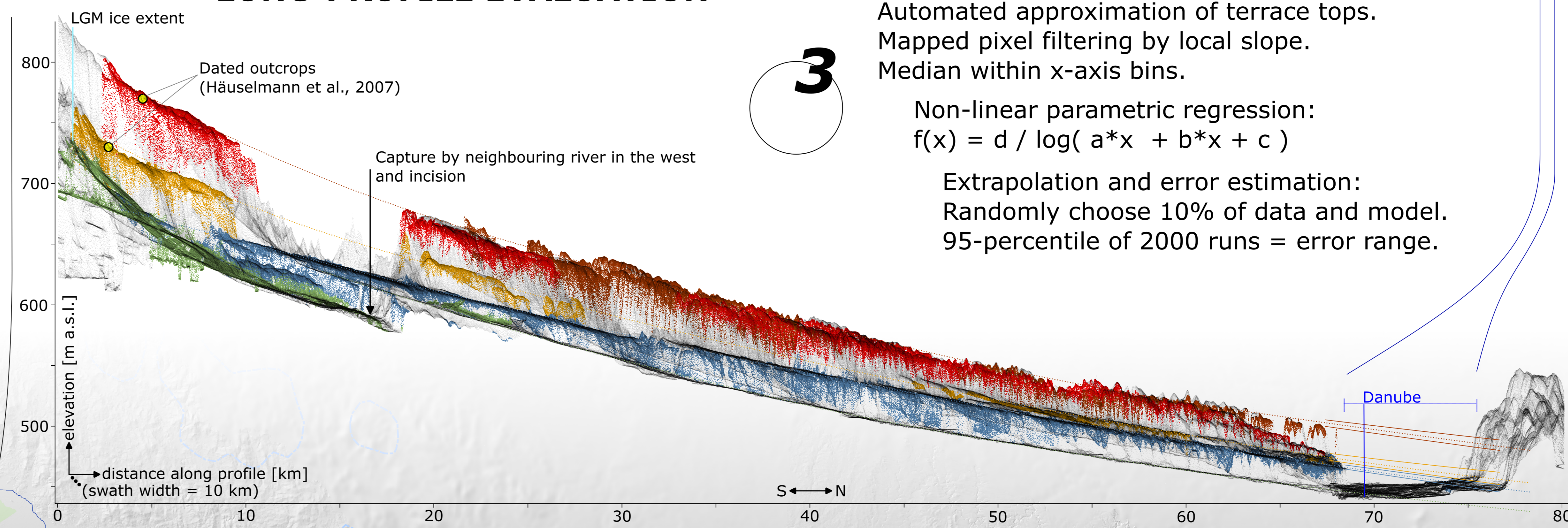


360° ORIENTATION CONTROL

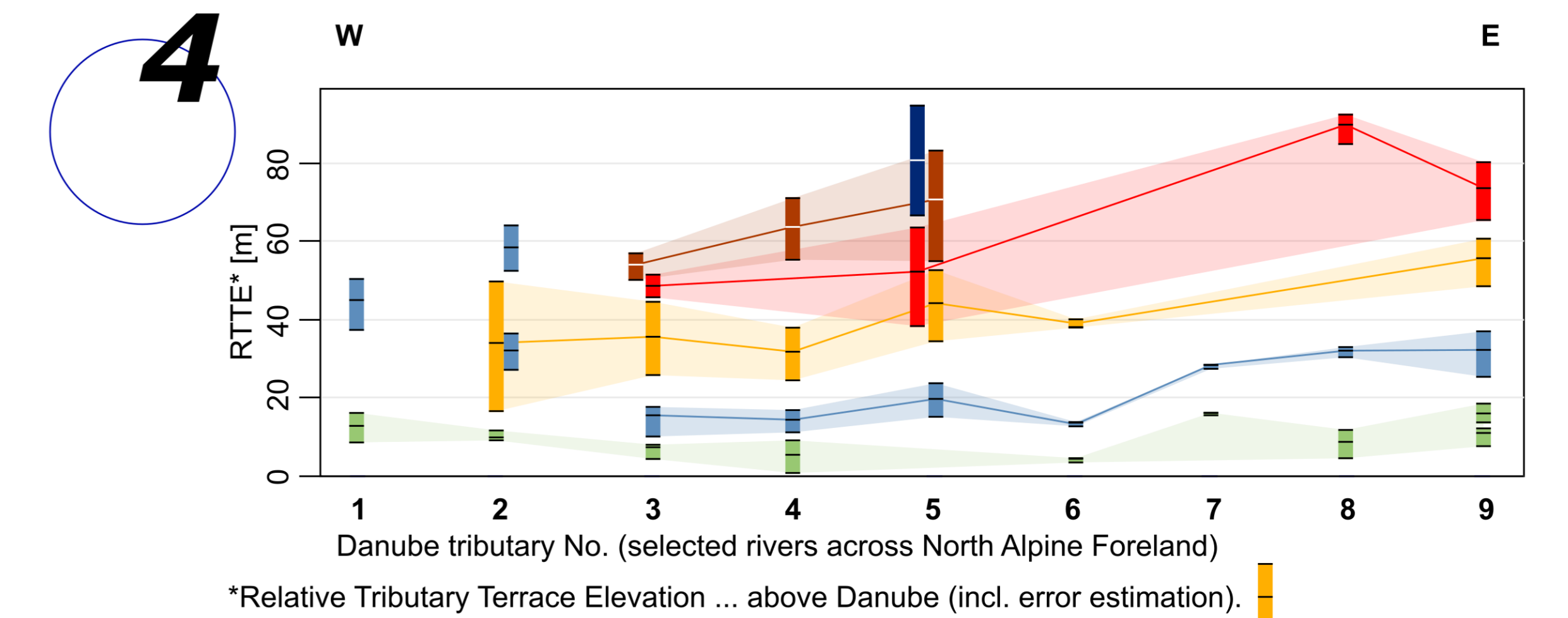


2 Profile orientation is critical for terrace correlation. 360° view allows for evaluating by viewing from all directions. Identify morphologic flats, dip direction and terrace correlation. Use orientation for long-profile construction (3).

LONG-PROFILE EVALUATION



PARALLELIZATION OF TERRACE STRATIGRAPHY



MODELLING TERRACE TOP PROFILES

Automated approximation of terrace tops.
Mapped pixel filtering by local slope.
Median within x-axis bins.

Non-linear parametric regression:
 $f(x) = d / \log(a*x + b*x + c)$

Extrapolation and error estimation:
Randomly choose 10% of data and model.
95-percentile of 2000 runs = error range.

Legend

Terrace stratigraphic levels from geol. maps of Austria & Germany

- Last glacial period
- Penultimate glacial period
- 3rd
- 4th
- 5th
- 6th

Partly more than one glacial period within one stratigraphic unit. Known inconsistencies from W - E.



Abstract

100 50 km