Late Pleistocene ice field on Jakupica Mt. (North Macedonia): extent and timing glaciation

Ruszkiczay-Rüdiger, Zs.(1), Kern, Z., Temovski, M., Madarász, B., Milevski, I., Lachner, J., Steier, P.

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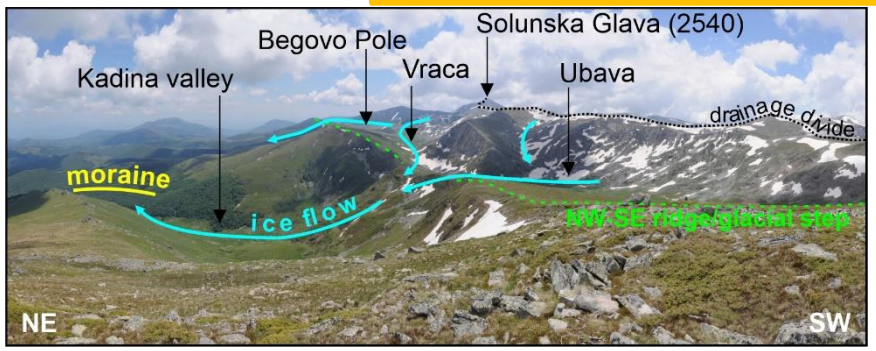
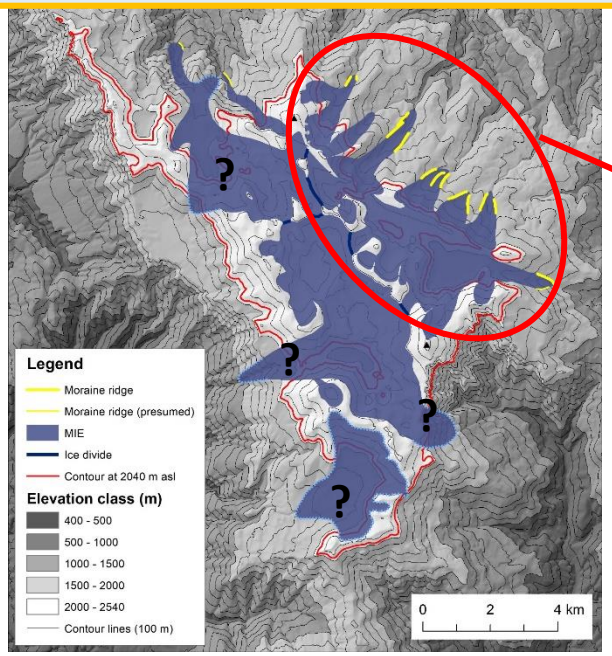
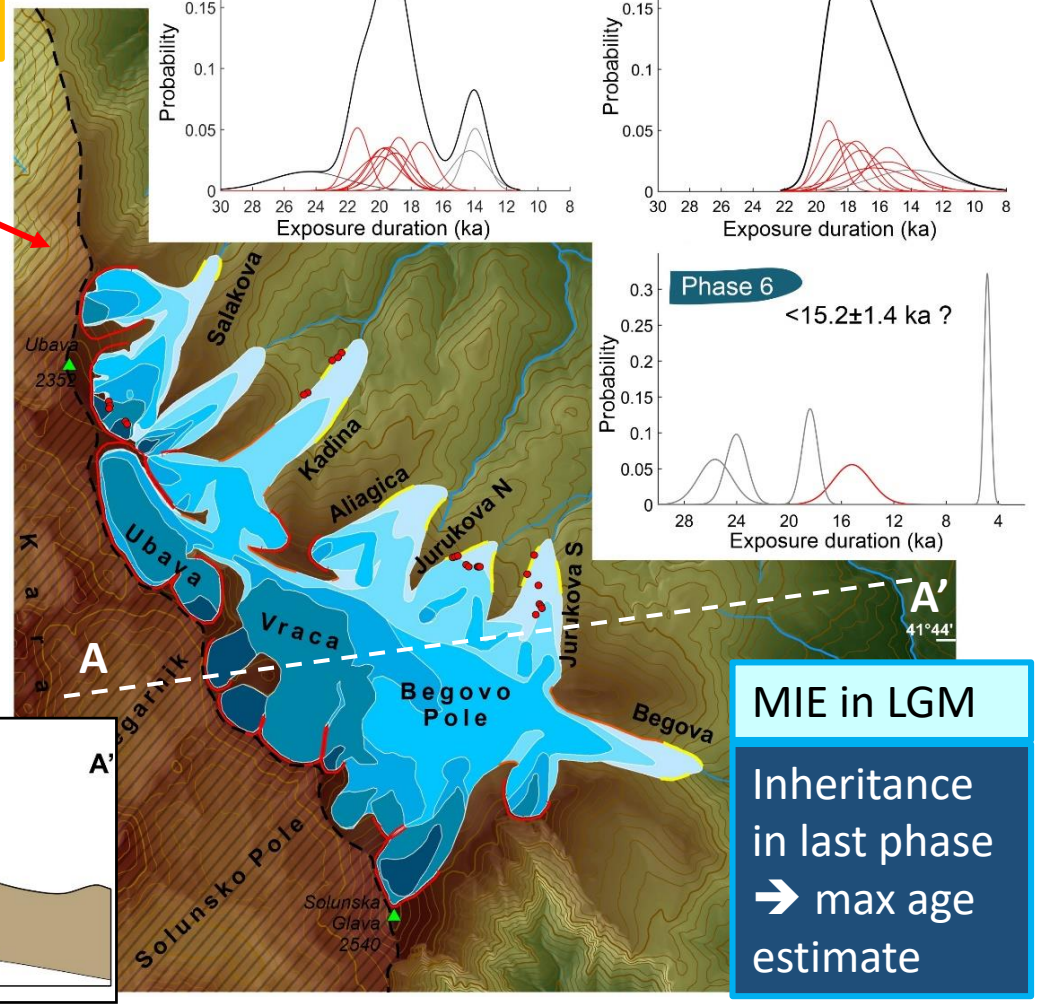
Ice field on a central plateau of 2000-2300 m asl. elevation
Max. area: ~45 km^2; max. thickness: ~250 m
Glacier tongues descending to ~1700-1600 m asl.
ELA at max. ice extent: ~2040 m asl.

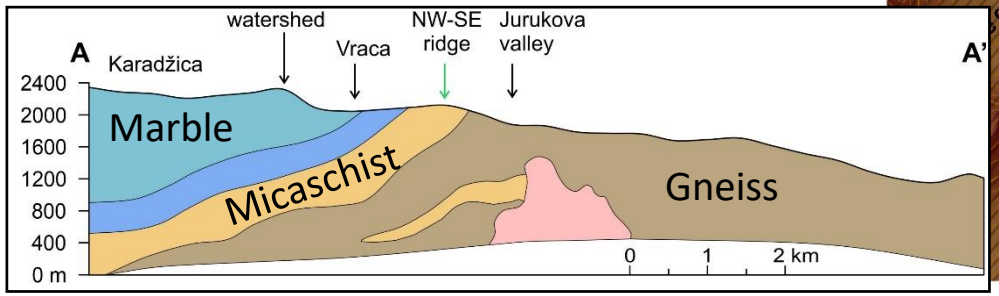




Glacier reconstruction and ^{10}Be CRE ages



- 6 **mapped** glacial phases
- Moraine boulders of 3 phases **sampled for ^{10}Be CRE dating**



MIE in LGM

Inheritance in last phase ➔ max age estimate

Supported by the NKFIH project 124807

The study area

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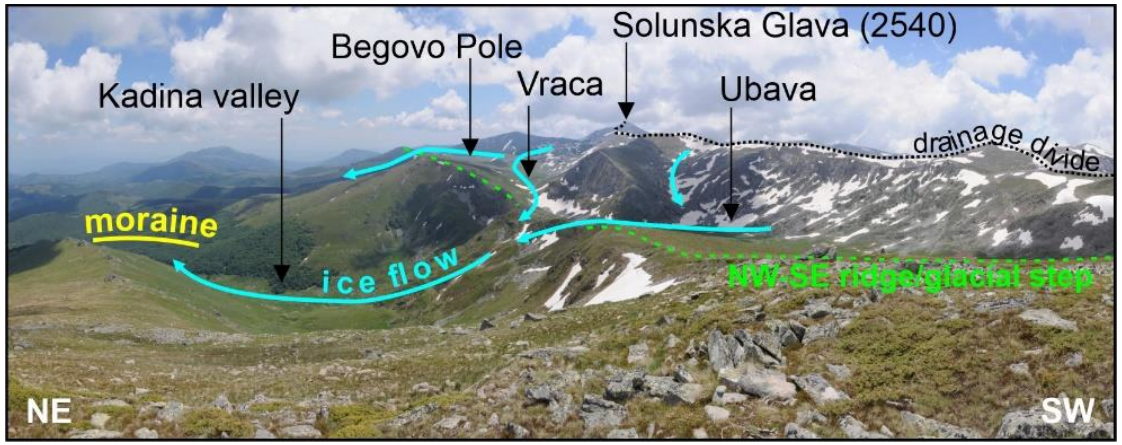

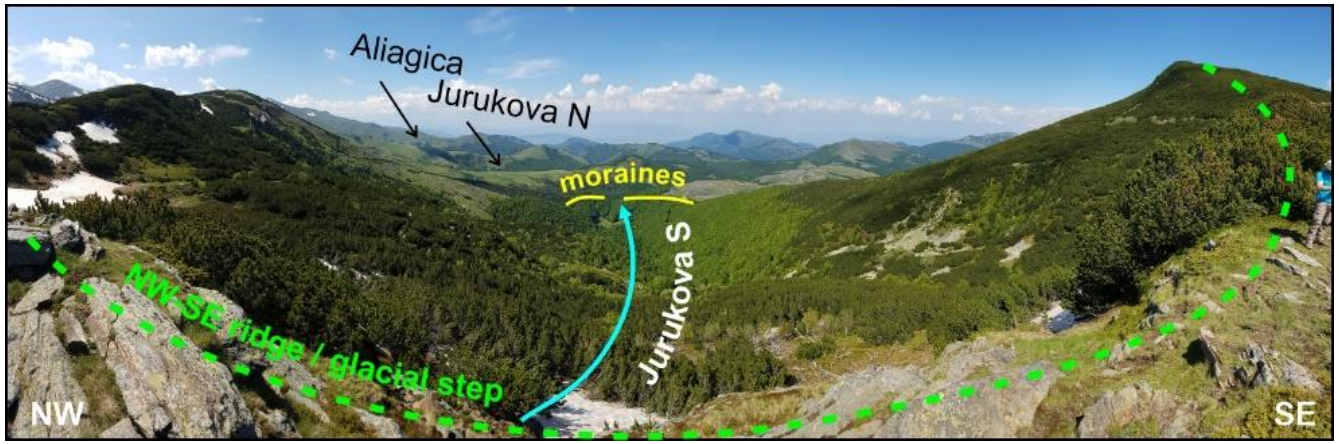

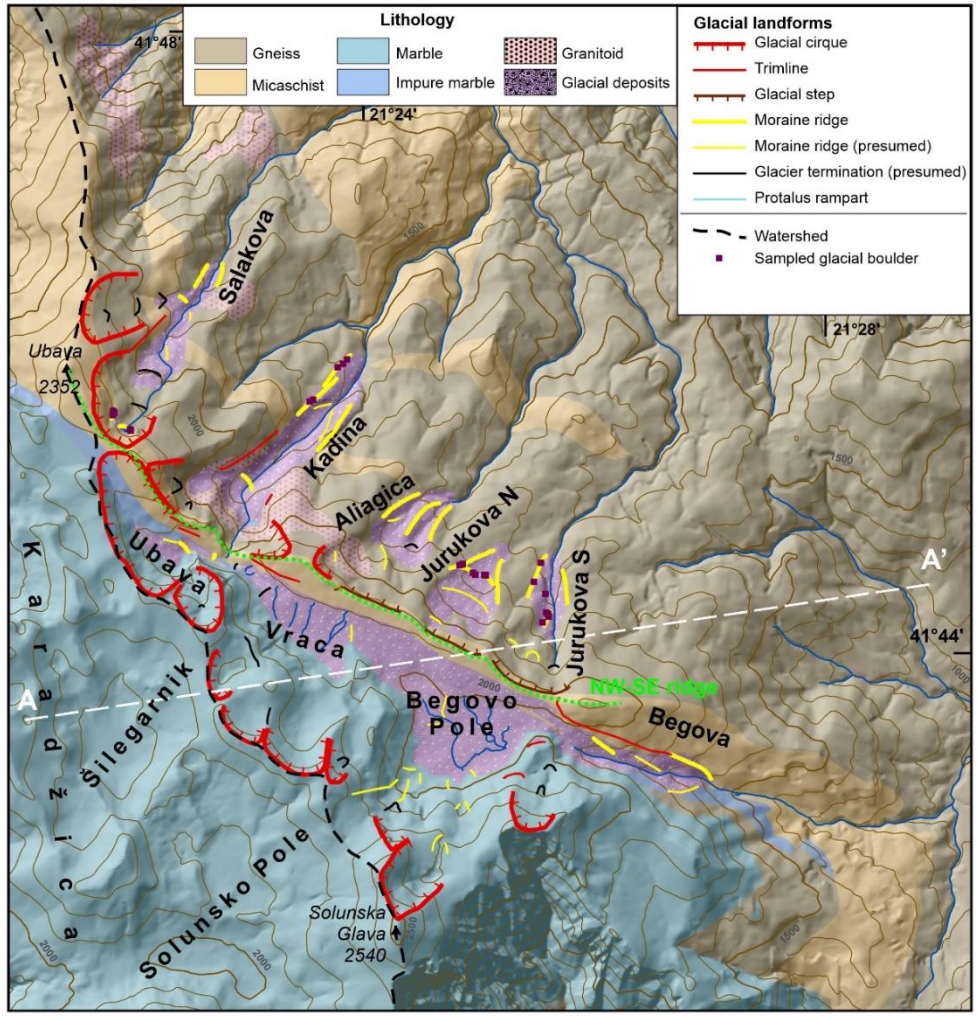

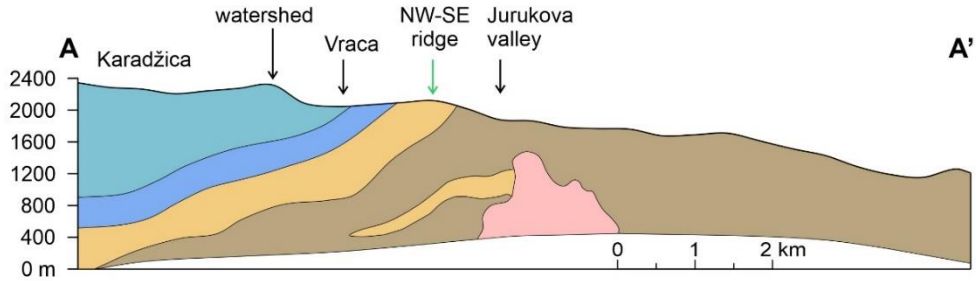

Lithology and morphology: Paleozoic metamorphic succession

- A plateau of 2000-2300 m asl. elevation of marble lithology
  - ➔ glaciokarstic landscape,
  - ➔ ice-field feeding ice to the valleys

➔ The targeted NE facing valleys in gneiss and micaschist

Objective: mapping of glacial landforms for glacier reconstruction

Sample collection

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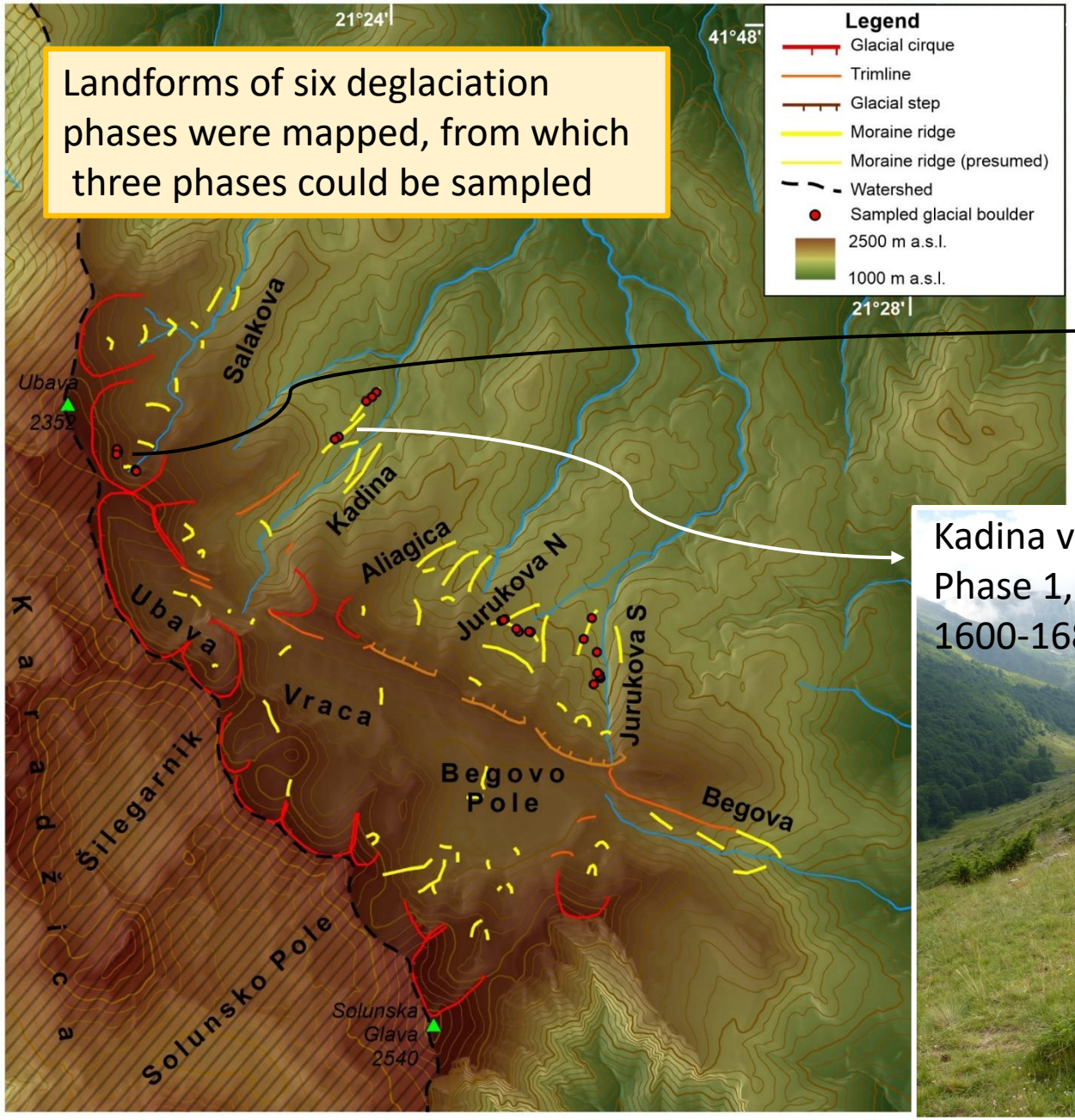
Landforms of six deglaciation phases were mapped, from which three phases could be sampled



Salakovo Lakes
Phase 6 terminal moraines
2170-2200 m asl.

Kadina valley
Phase 1, lateral moraines
1600-1680 m asl.

Objective: age determination of the deglaciation phases using in situ produced ^{10}Be

Sample collection

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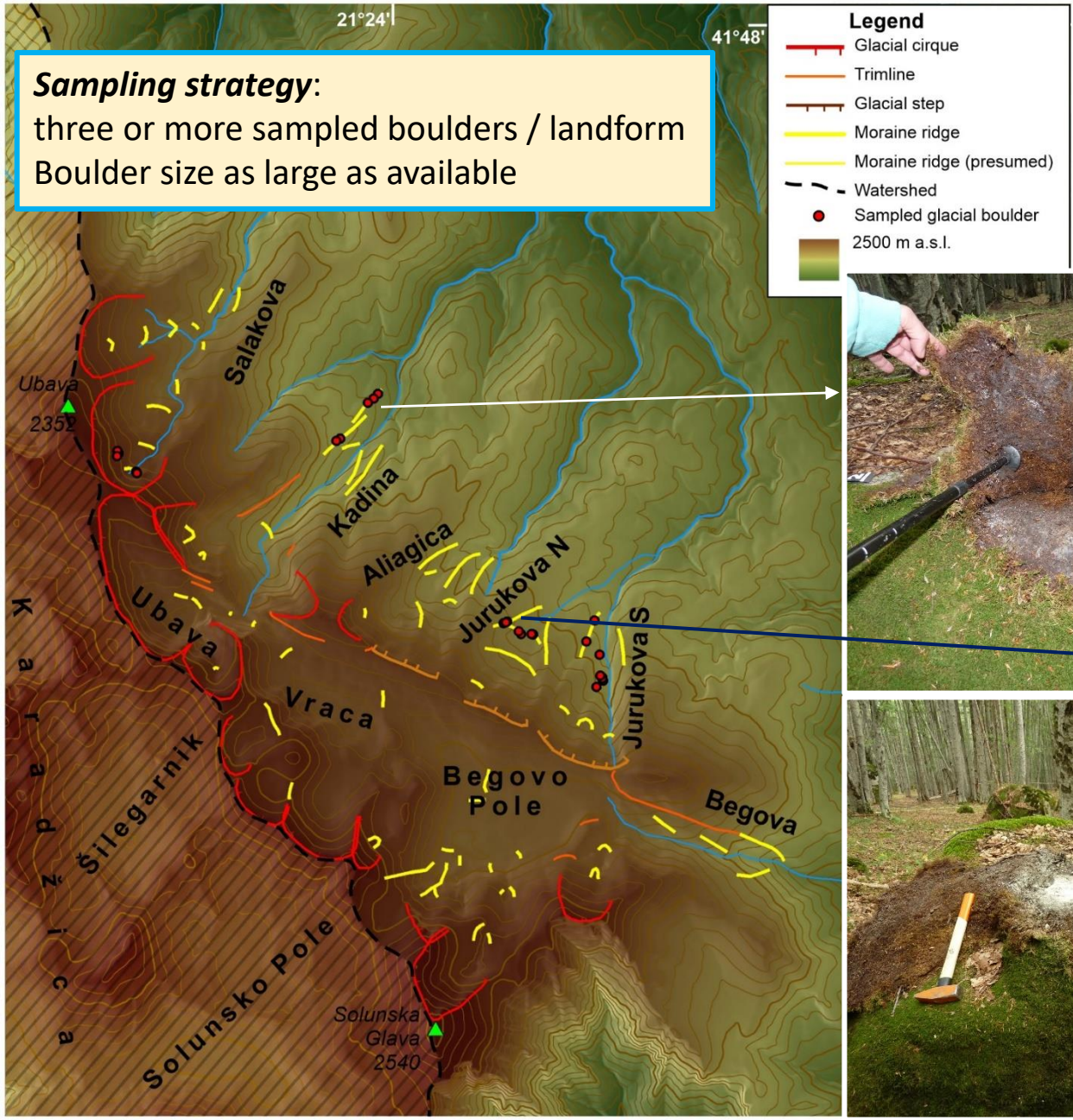
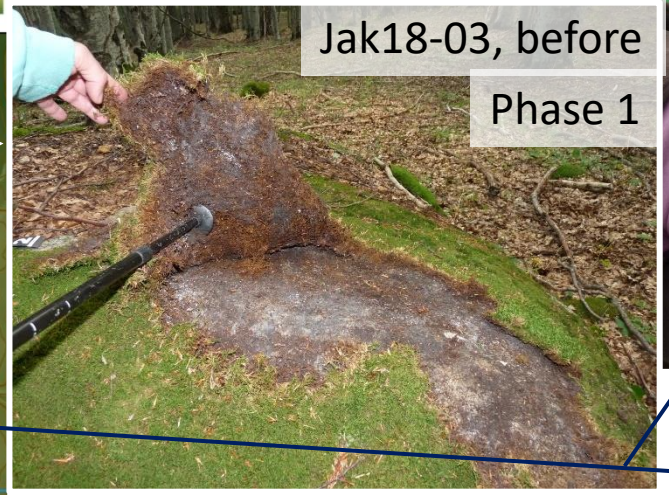
Sampling strategy:
three or more sampled boulders / landform
Boulder size as large as available





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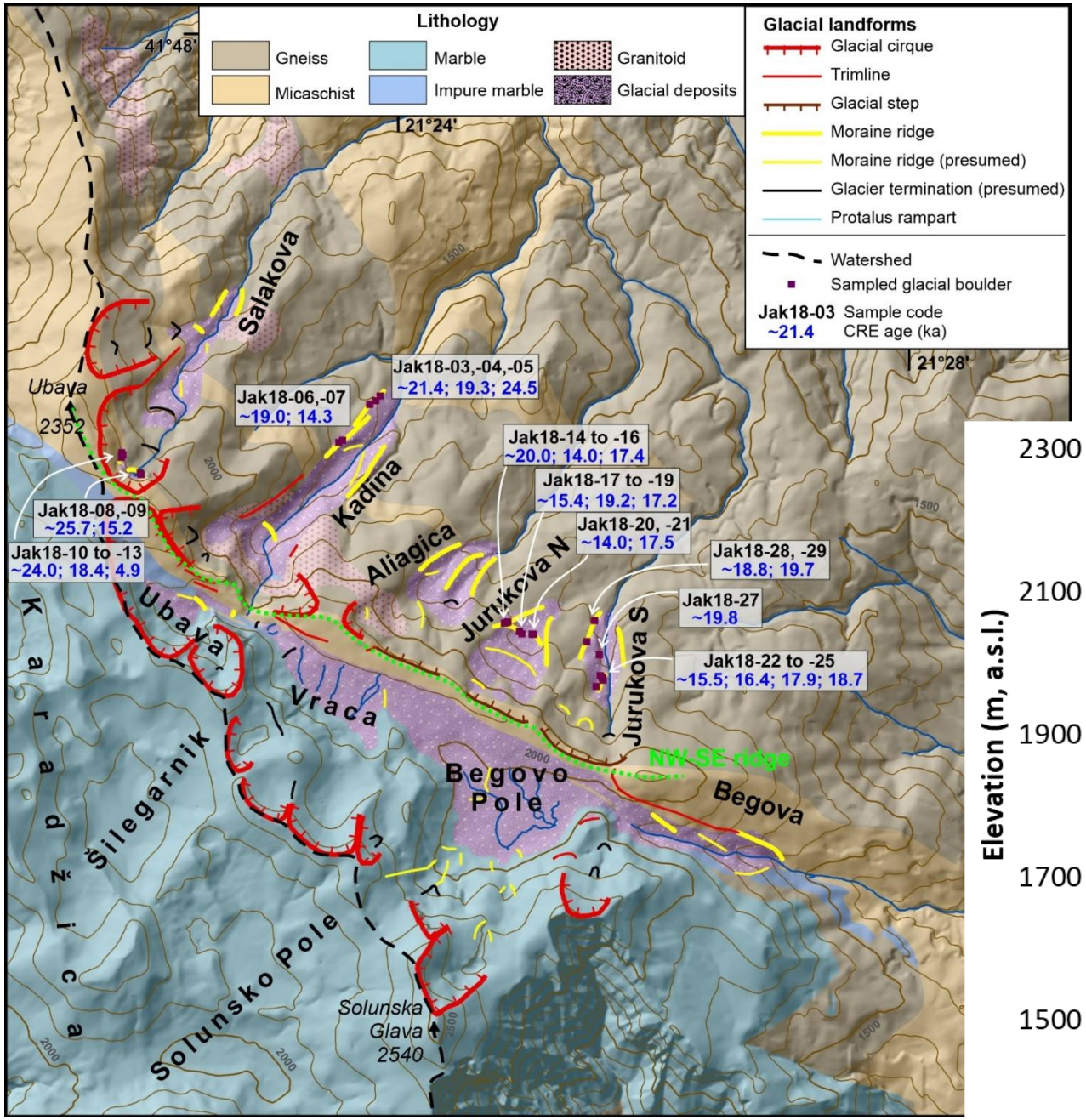
Sample collection and ^{10}Be cosmic ray exposure ages

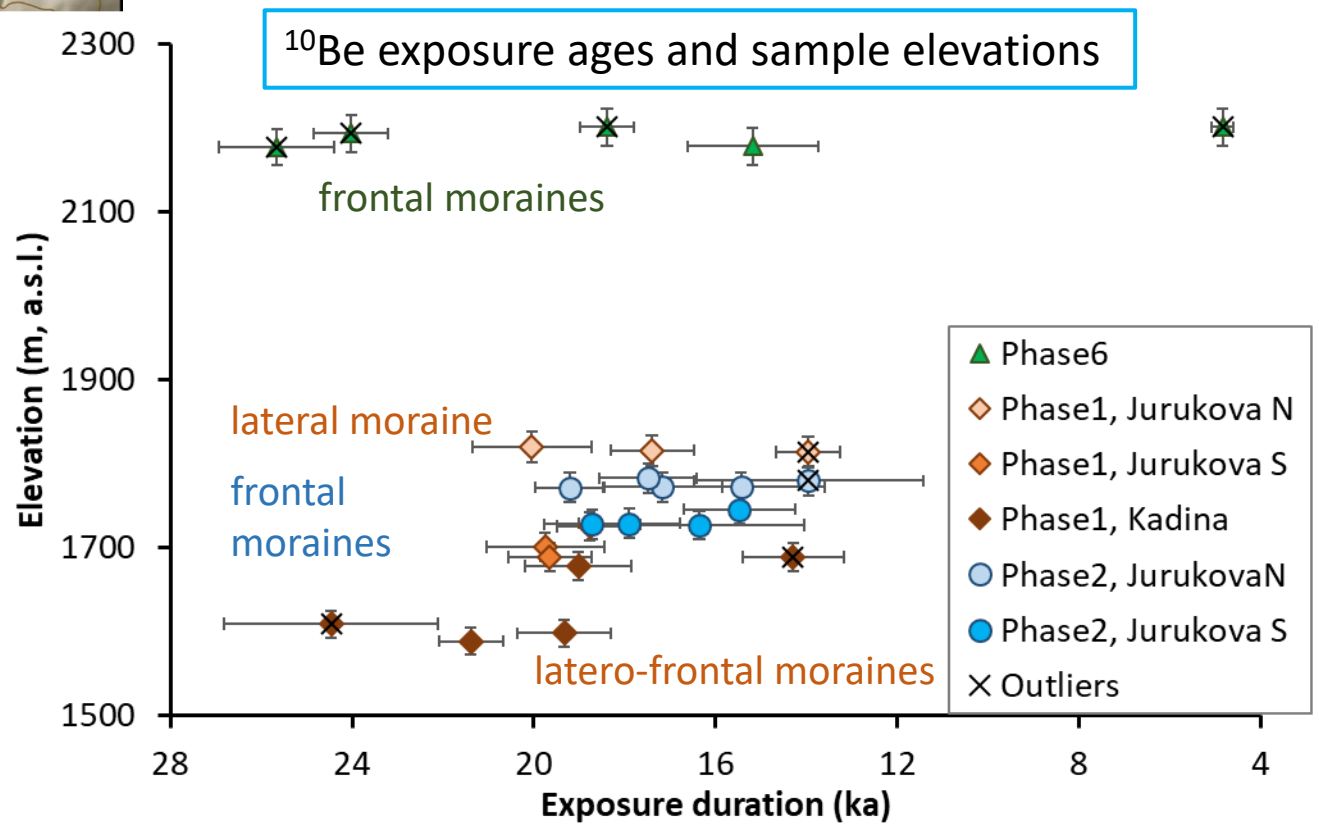
Moraine boulders of 3 phases were sampled (n=25):

Phase 1: maximum ice extent
(glacier tongues down to 1600-1700 m a.s.l.)

Phase 2: second largest ice extent

Phase 6: last deglaciation phase (~2200 m a.s.l.)





Influence of boulder size on ^{10}Be CRE ages

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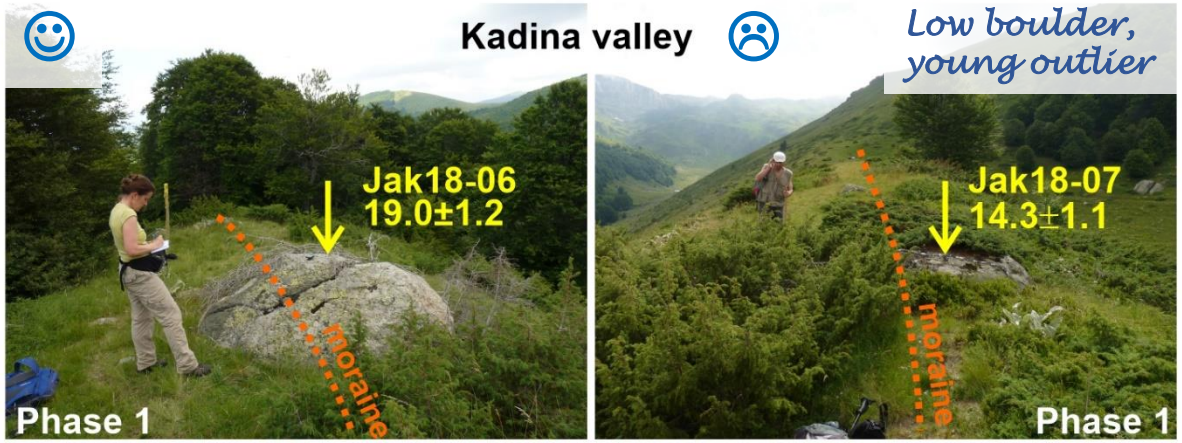
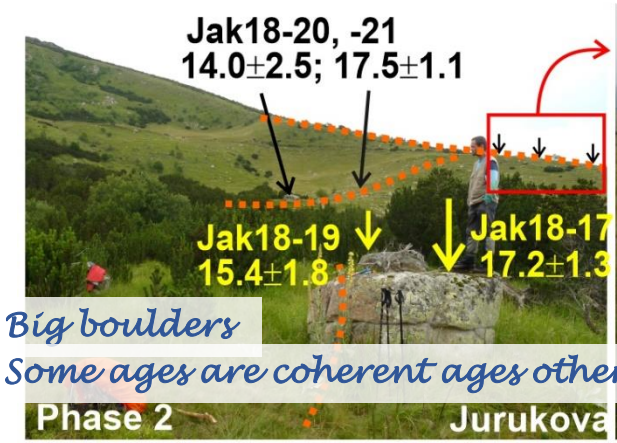
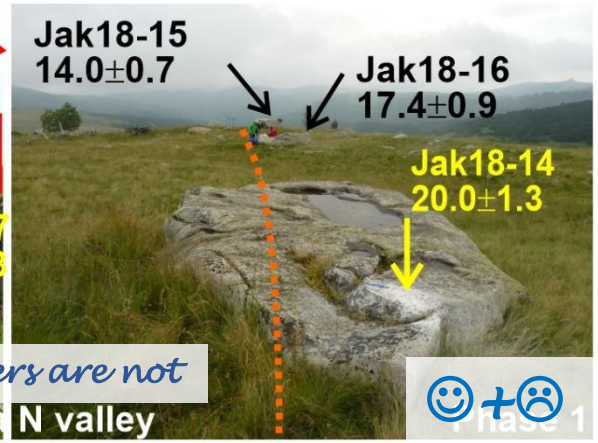
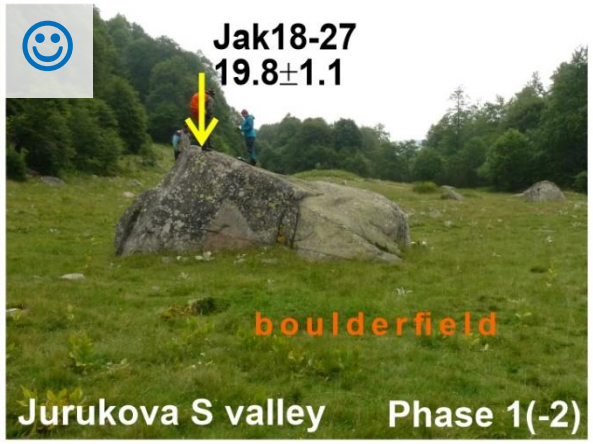
Is it a rule that small boulder size ➔ post-depositional processes ➔ young outlier? *Not always …*

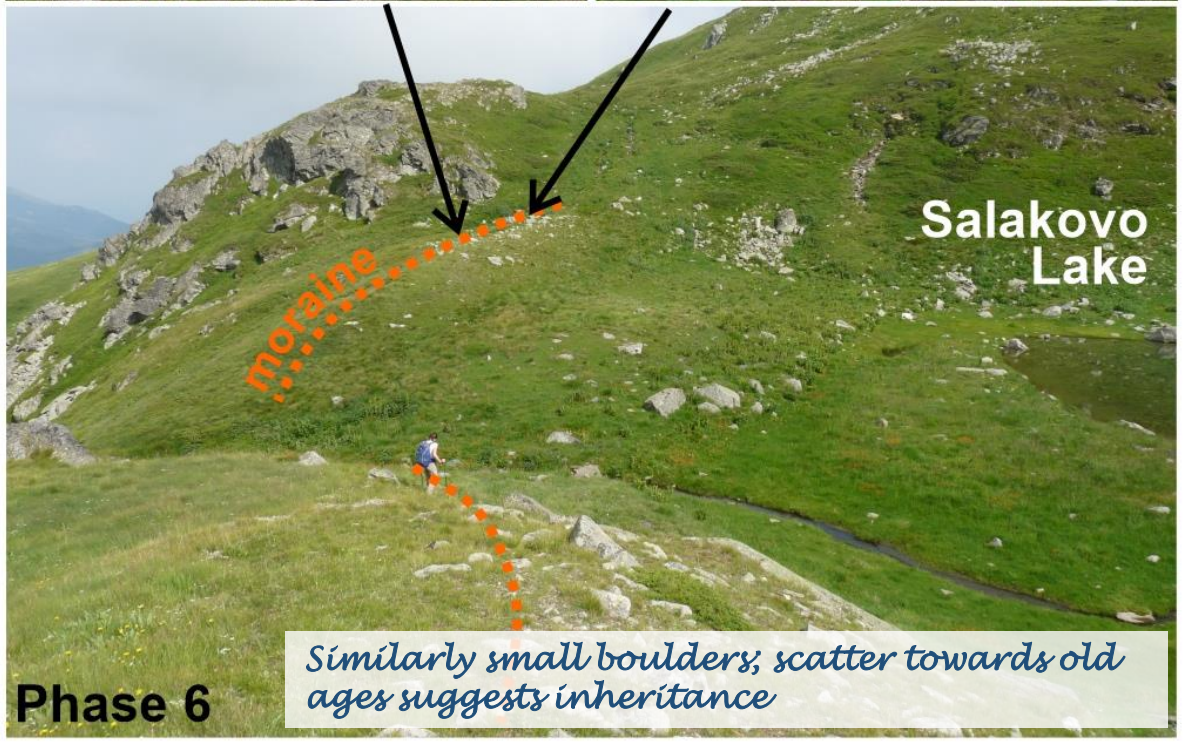






Big boulders
Some ages are coherent ages others are not





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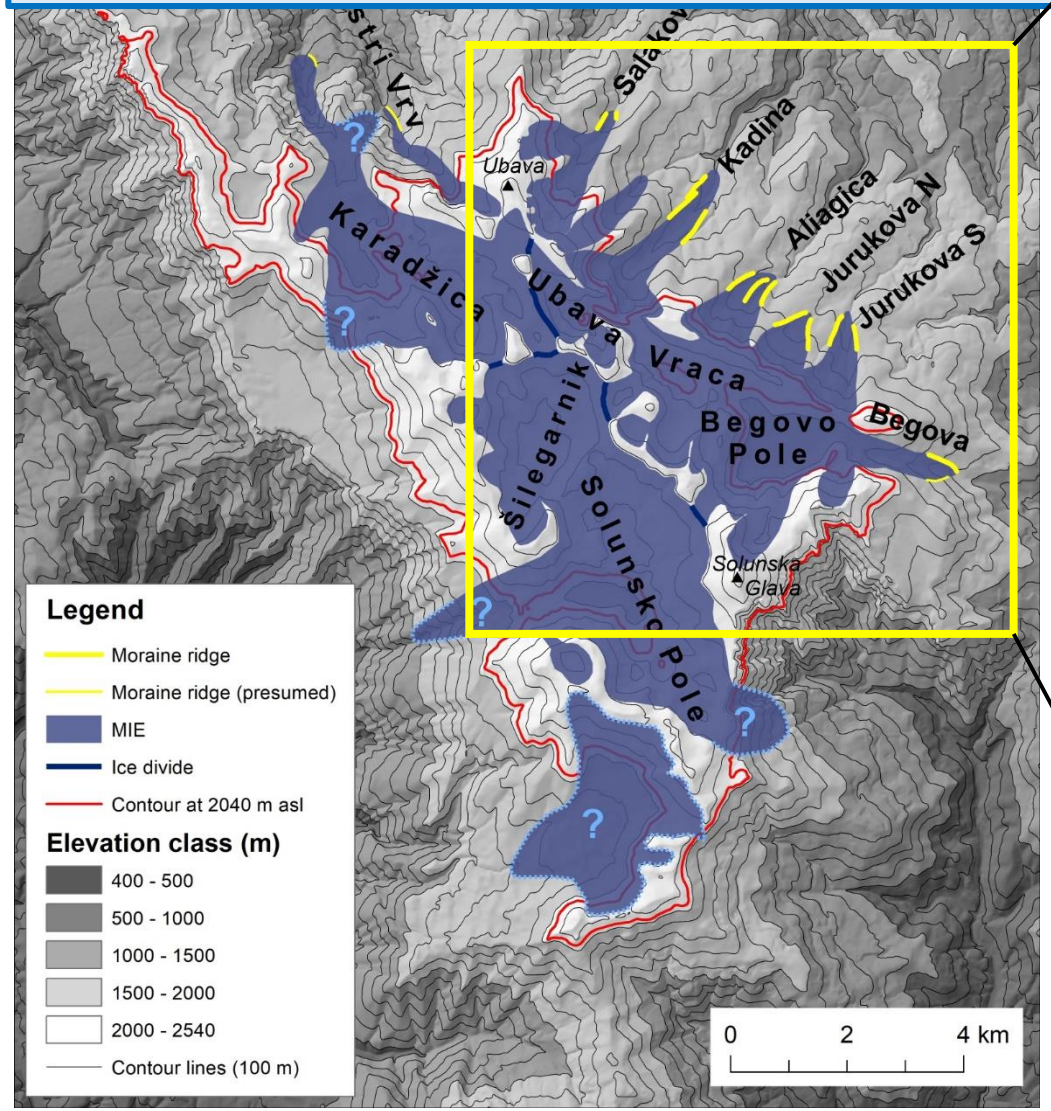

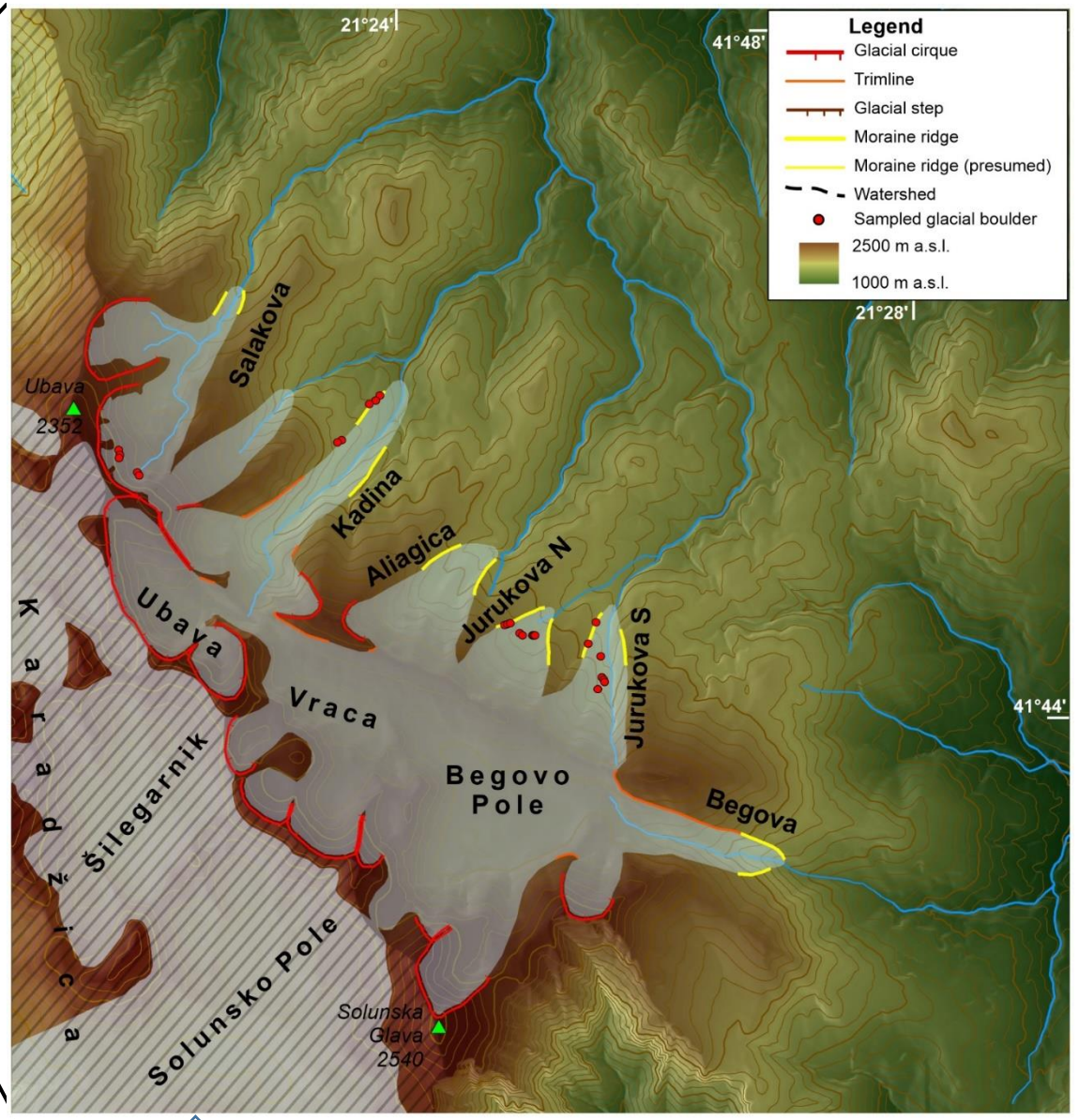

area outside of detailed mapping

Glacier reconstruction and CRE ages

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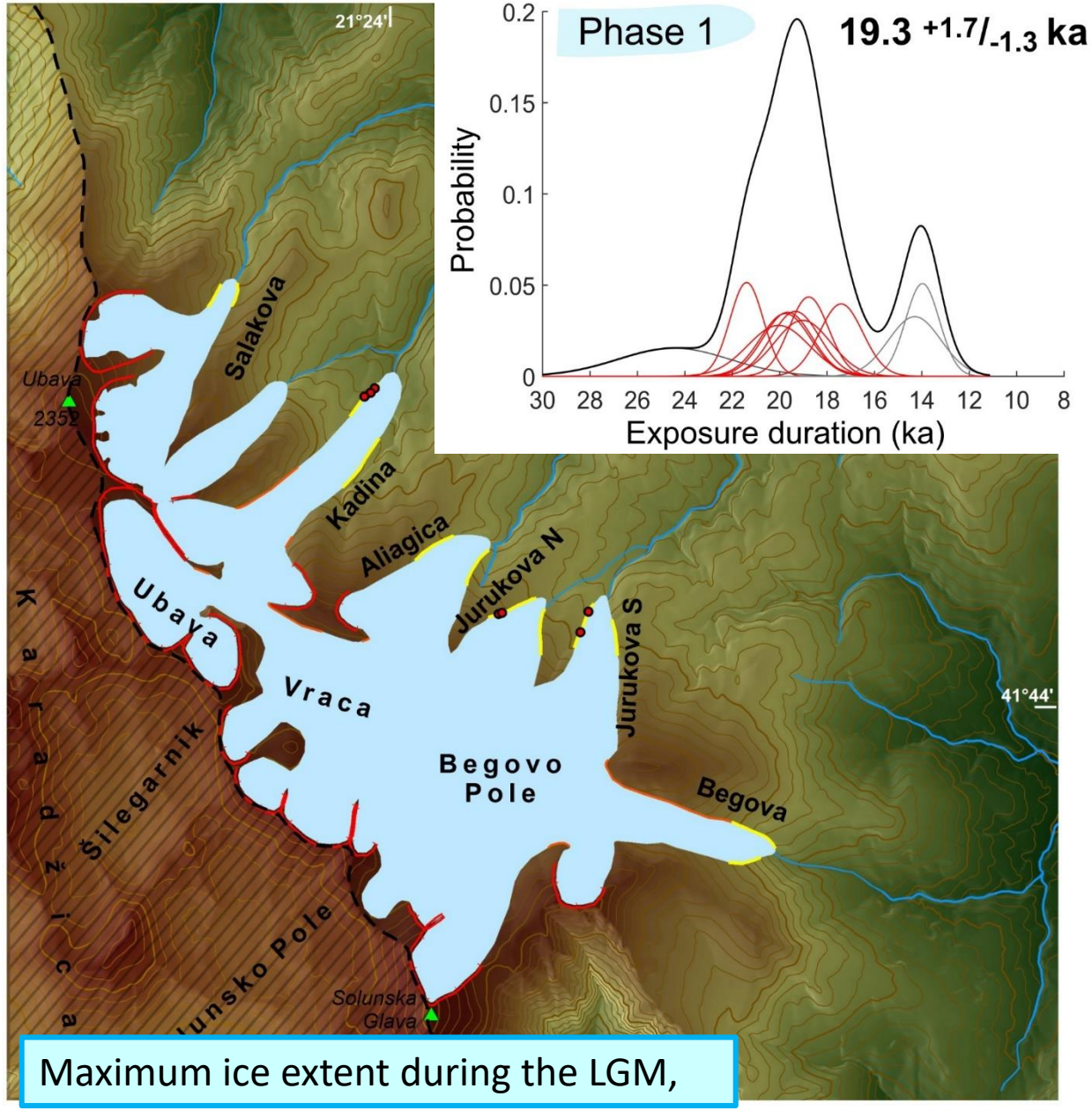
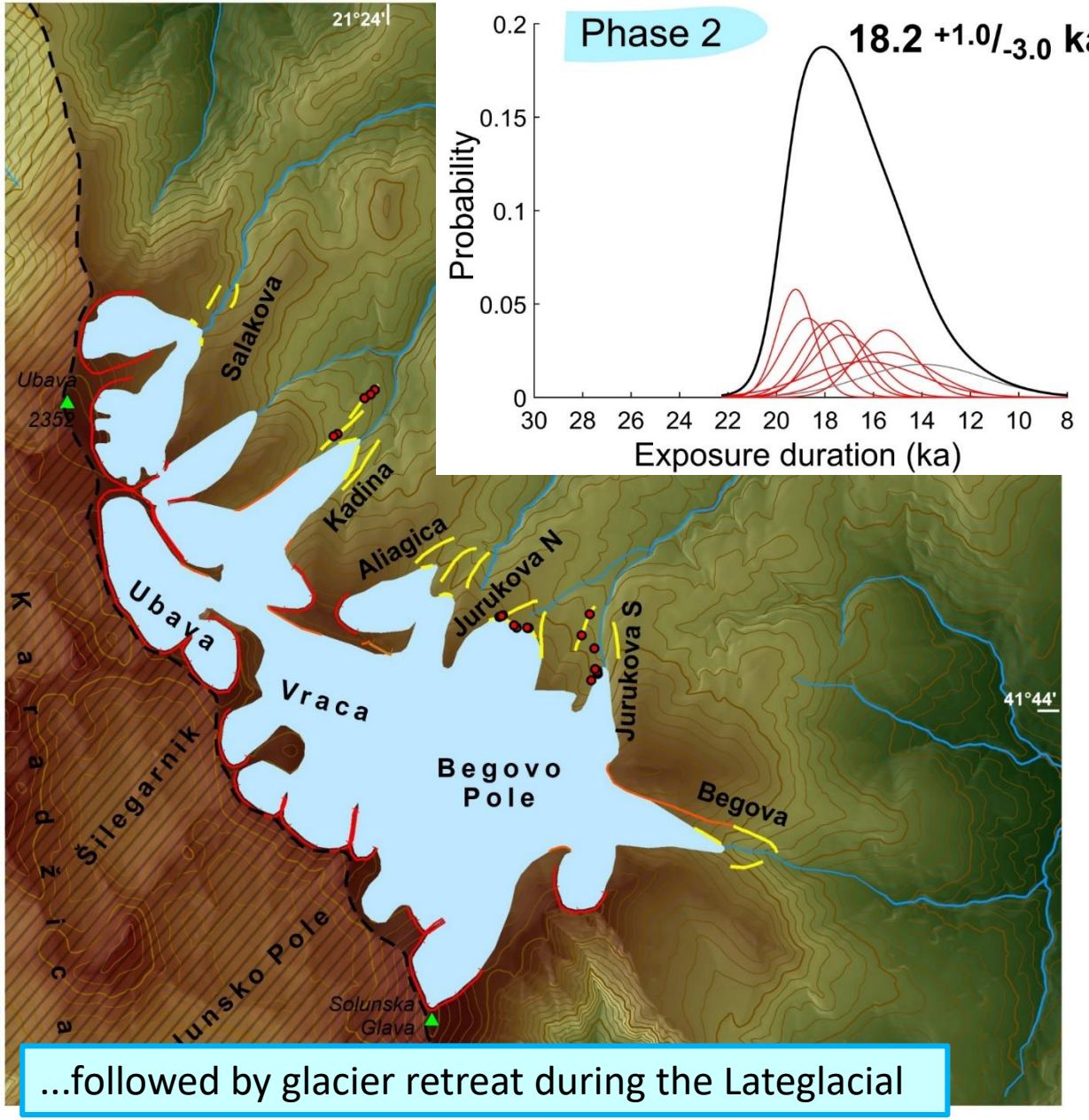


Maximum ice extent during the LGM,



...followed by glacier retreat during the Lateglacial

Glacier reconstruction and CRE ages

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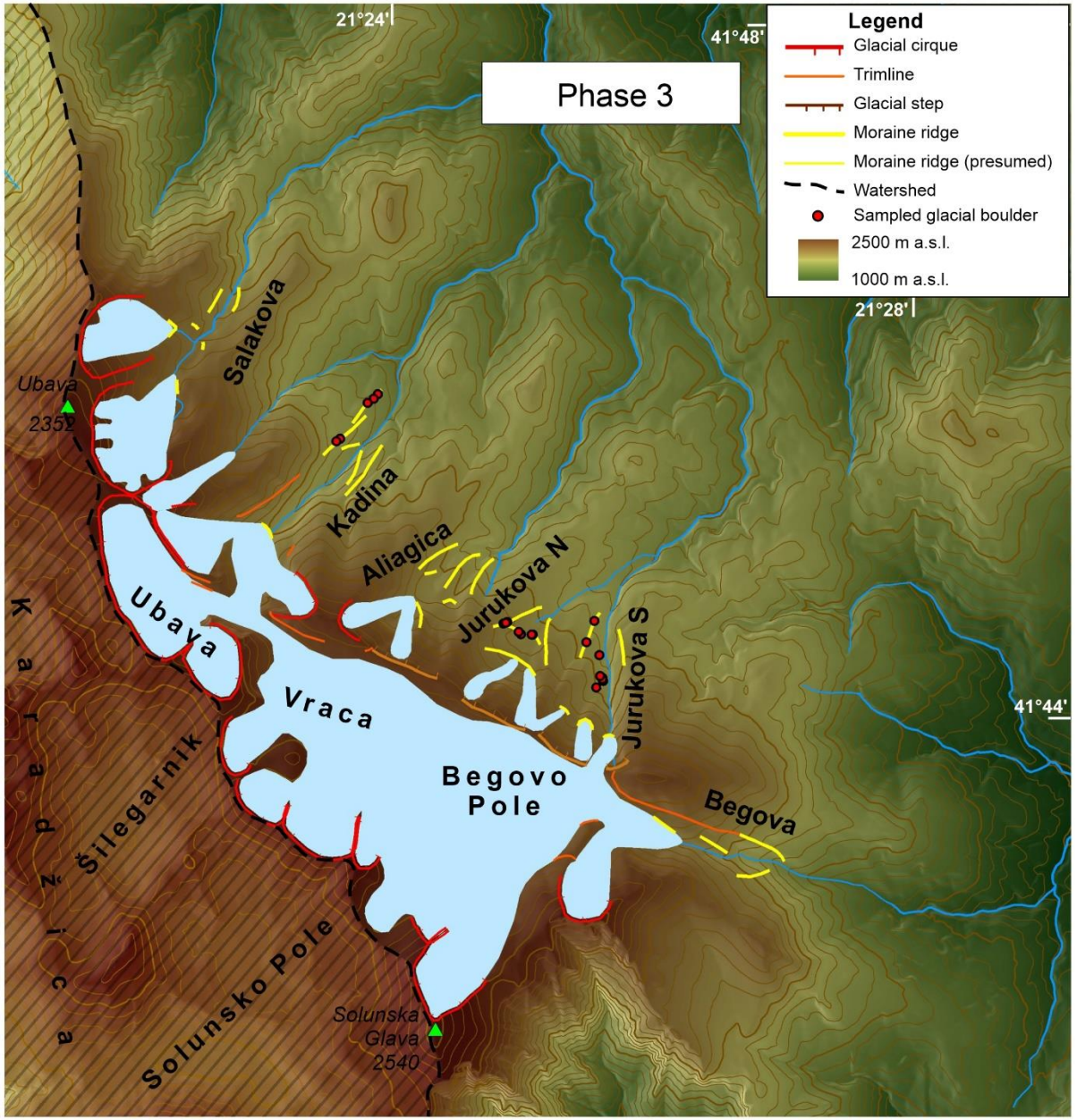

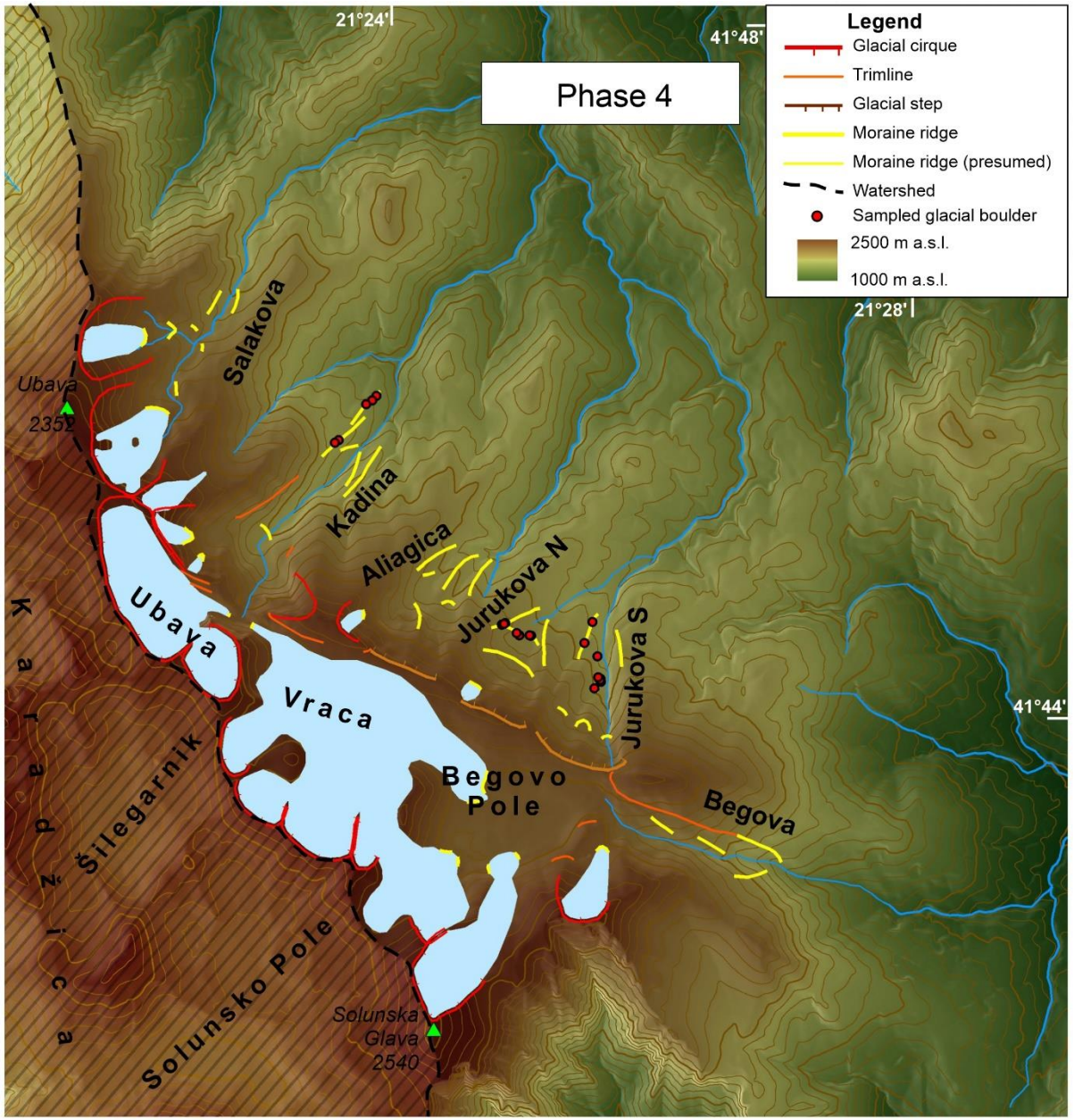

Glacier reconstruction and CRE ages

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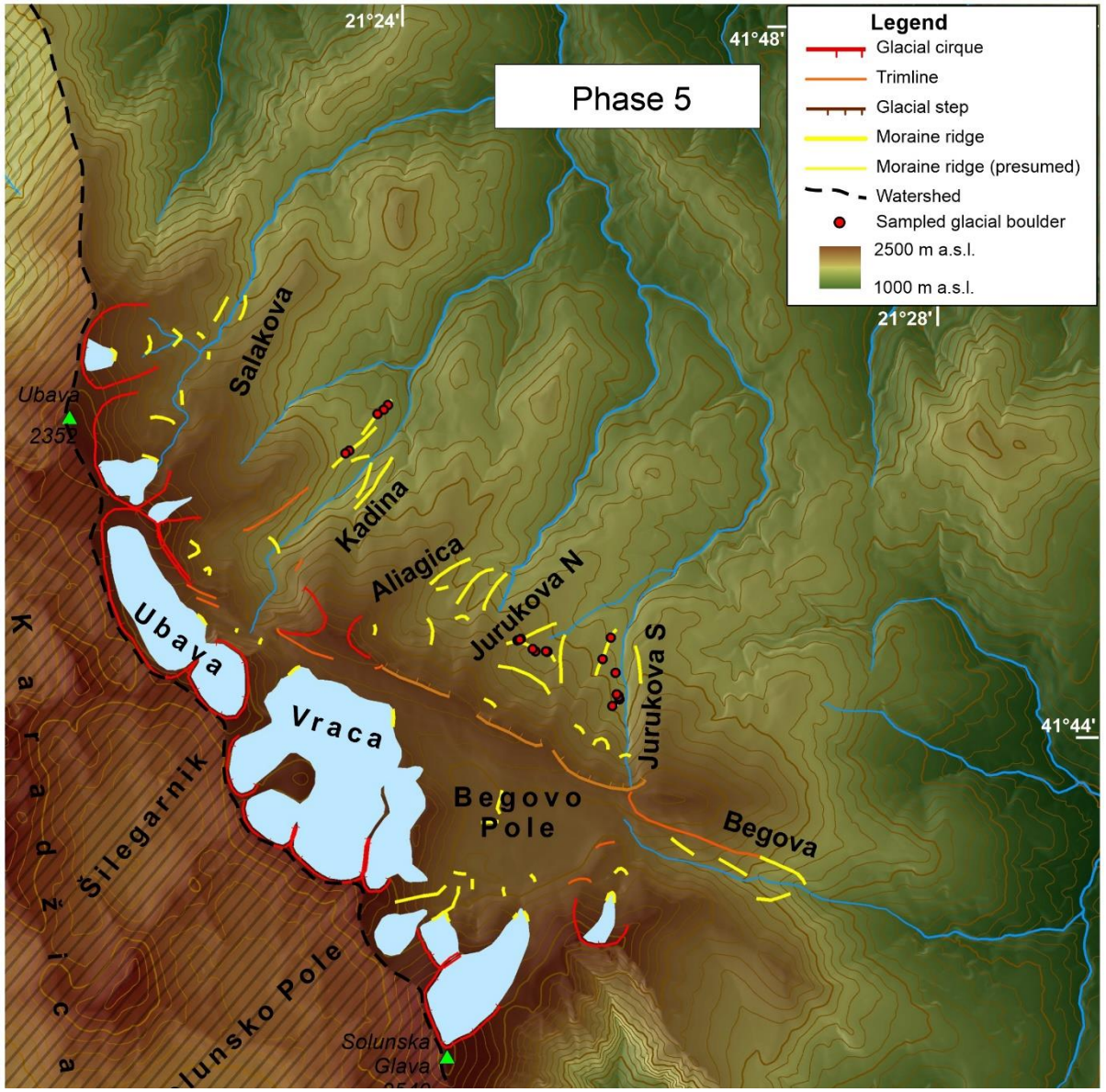

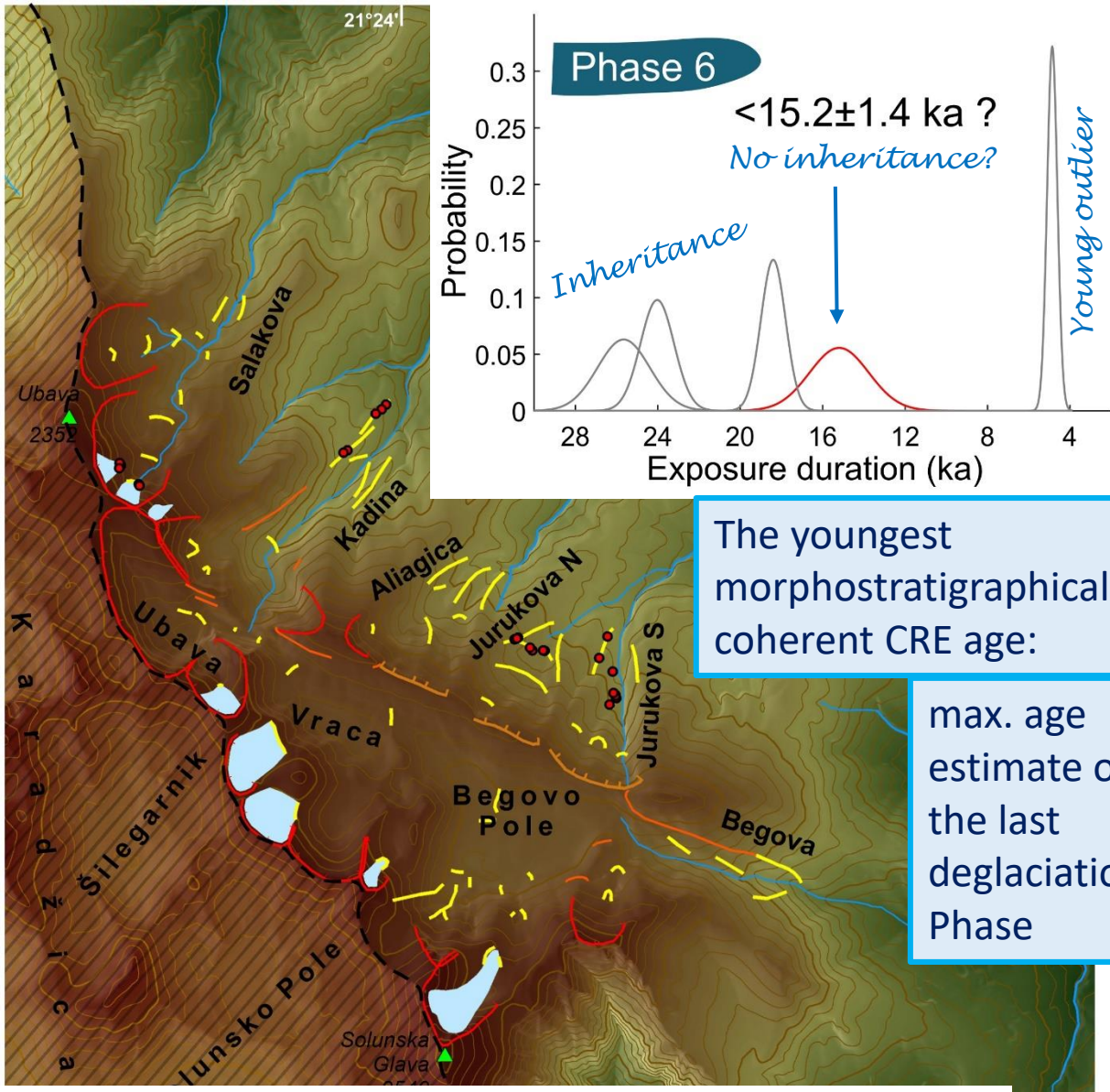

The youngest morphostratigraphically coherent CRE age:

max. age estimate of the last deglaciation Phase

Thanks to the NKFIH FK124807, the GINOP-2.3.2-15-2016-00009 and the Radiate Transnational Access 19001688-ST projects.