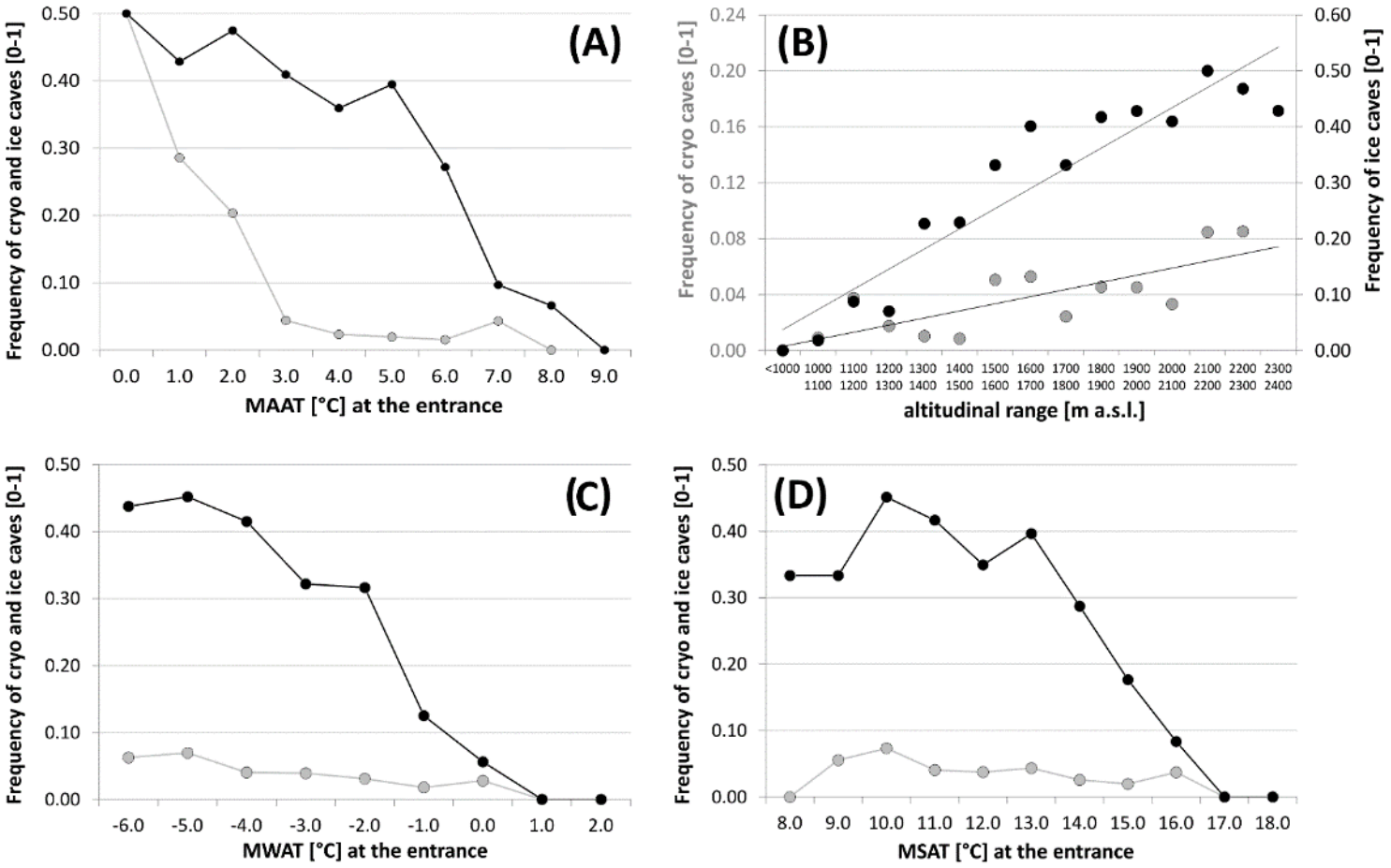
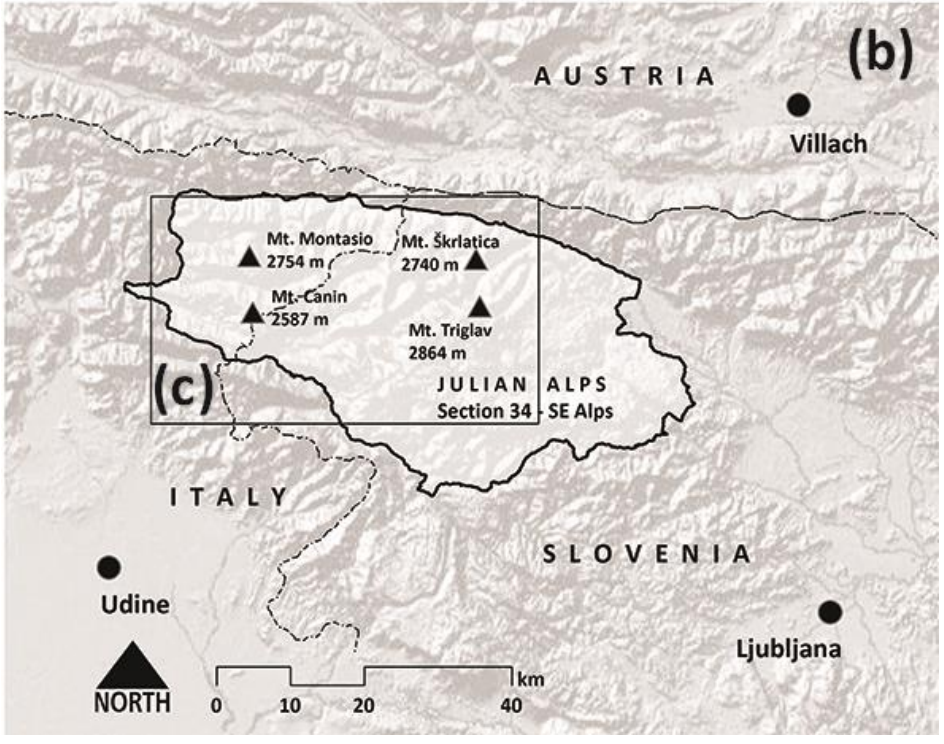
The periglacial environment – **Ice Caves**

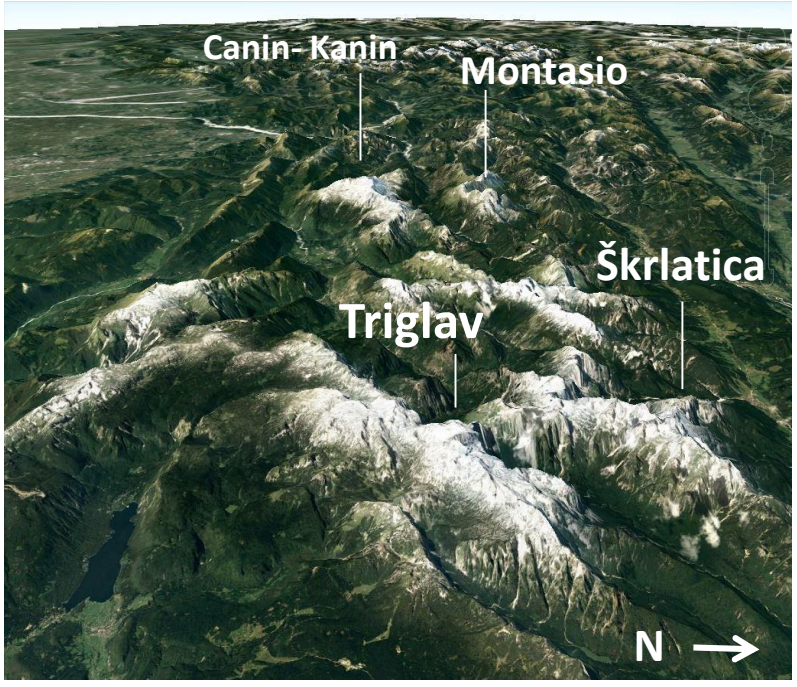
Cryo cave climatology → (A) mainly concentrated where MAAT < 5°C ; MAAT < 2°C for ice caves
(B) P increase with altitude (R=0.96 (cryo) & 0.97 (ice))
(C) not present where MWAT>0°C; significant increase MWAT<-2°C
(D) MSAT not significant → abrupt decrease with MSAT > 13°C



(Colucci et al., 2016 - Geomorphology)

The Canin massif – **Julian Alps**





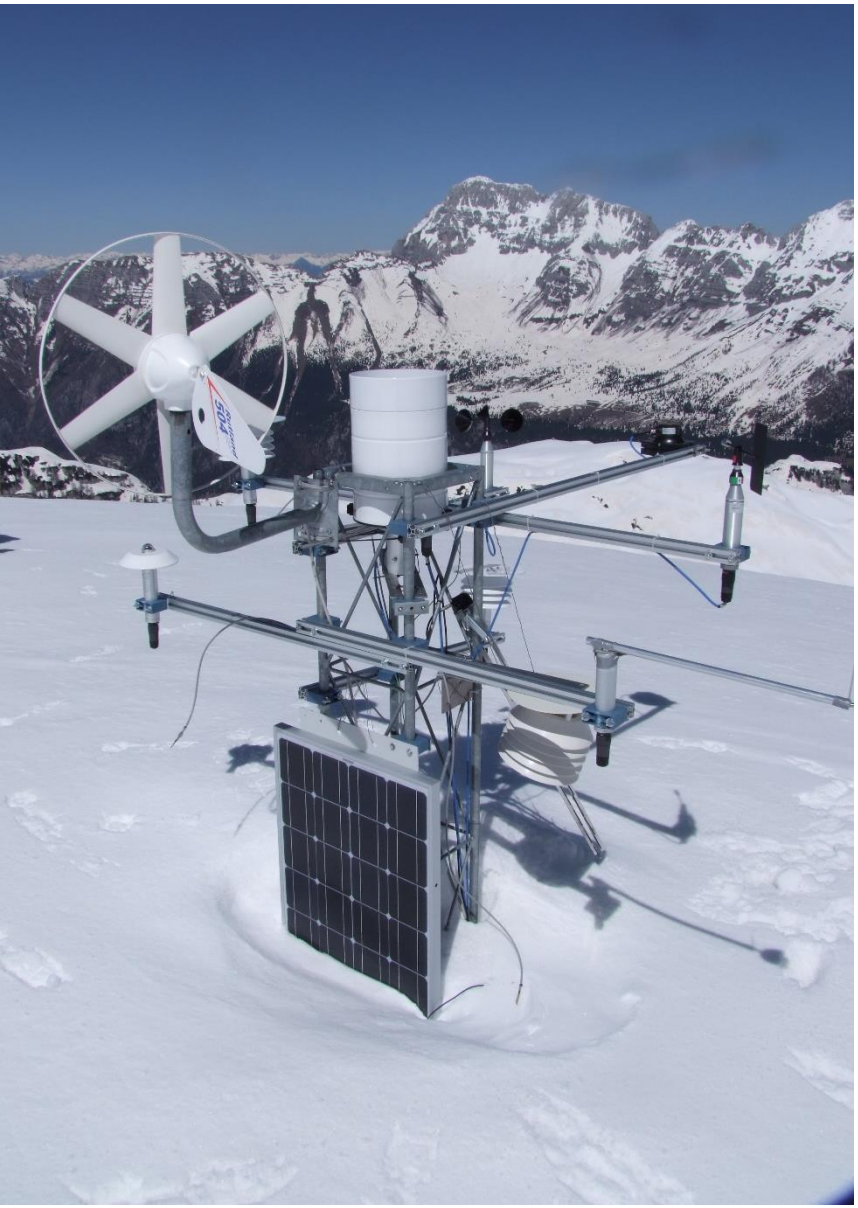
The Julian Alps
1853 km^2
west to east across the Ita–Slo border

Carbonate massifs

Highest elevations
- Mt.Triglav slo (2864m)
- Mount Montasio ita (2754 m)
- Mount Škrlatica slo (2740 m)

PARCO NATURALE PREALPI GIULIE

Unione Meteorologica del Friuli Venezia Giulia ONLUS



Canin AWS - late April 2013

Automatic weather station (AWS) Canin (since 2012)
2203 m asl - h 9 m
Air temperature
Relative humidity
Precipitation (liquid)
Snow height
Wind speed and direction
Soil temperature (7 depths)
Solar radiation (total and reflected)

Canin AWS - late April 2014

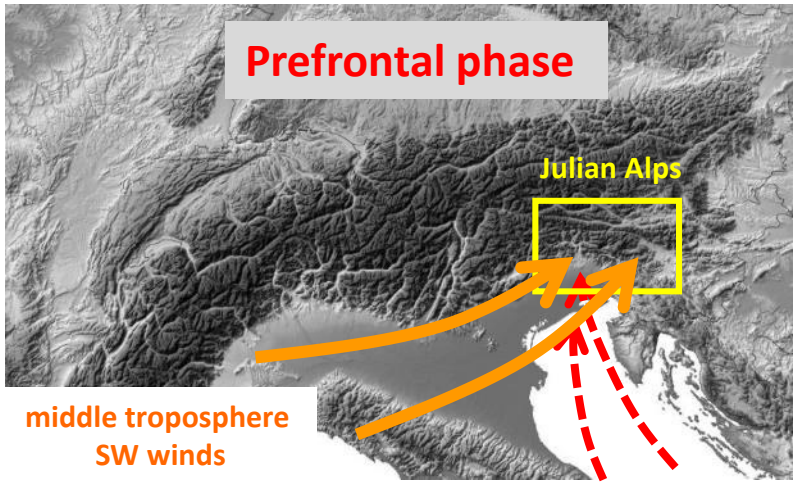
Study area and climatology

Ceschia et al., 1991

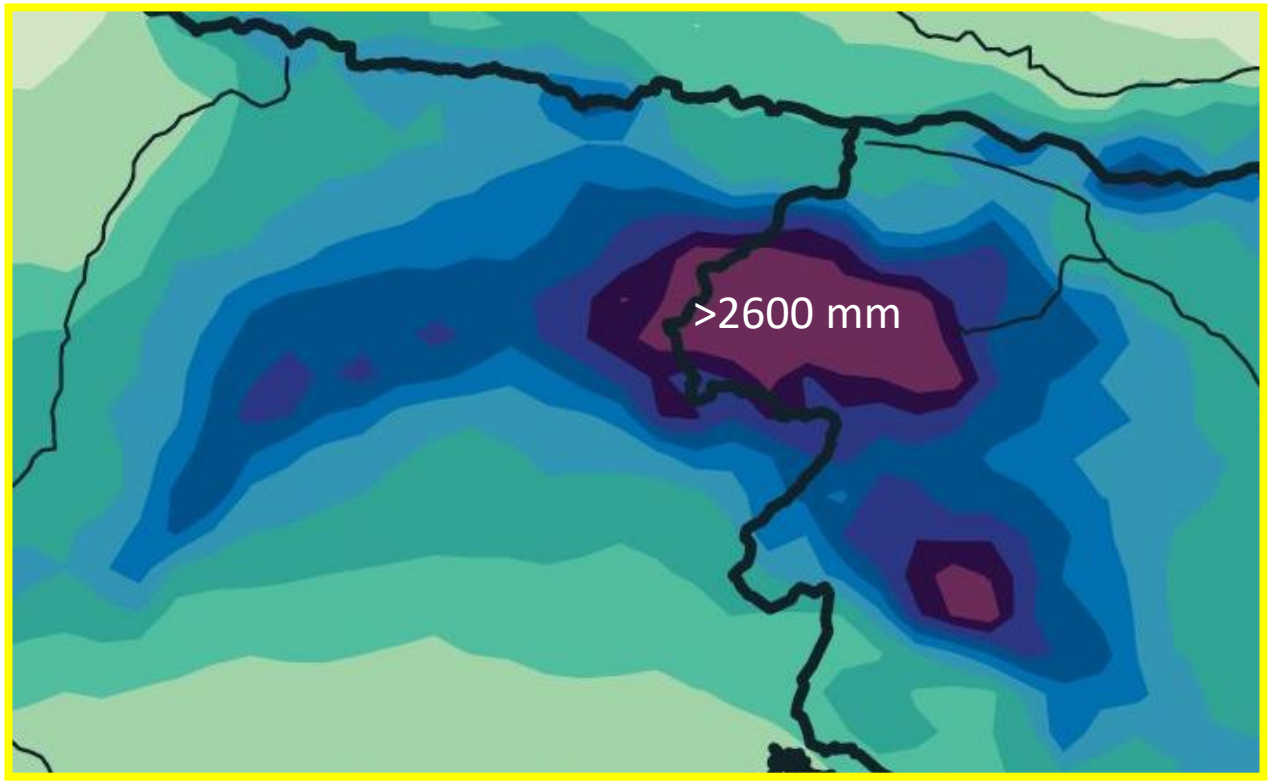
Synoptic generally prevails

Spring and early summer convection is predominant

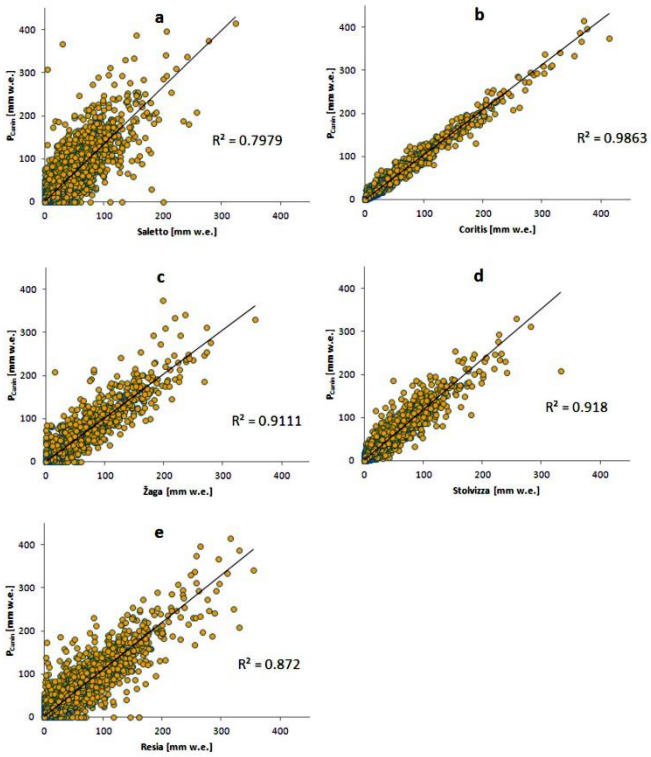
* **Cw (1800 m) = 7.2 m (winter snow accumulation)**

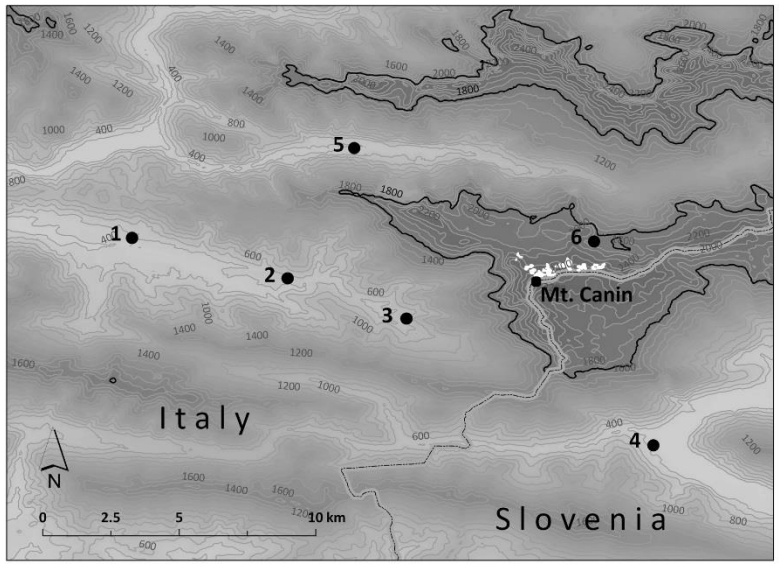


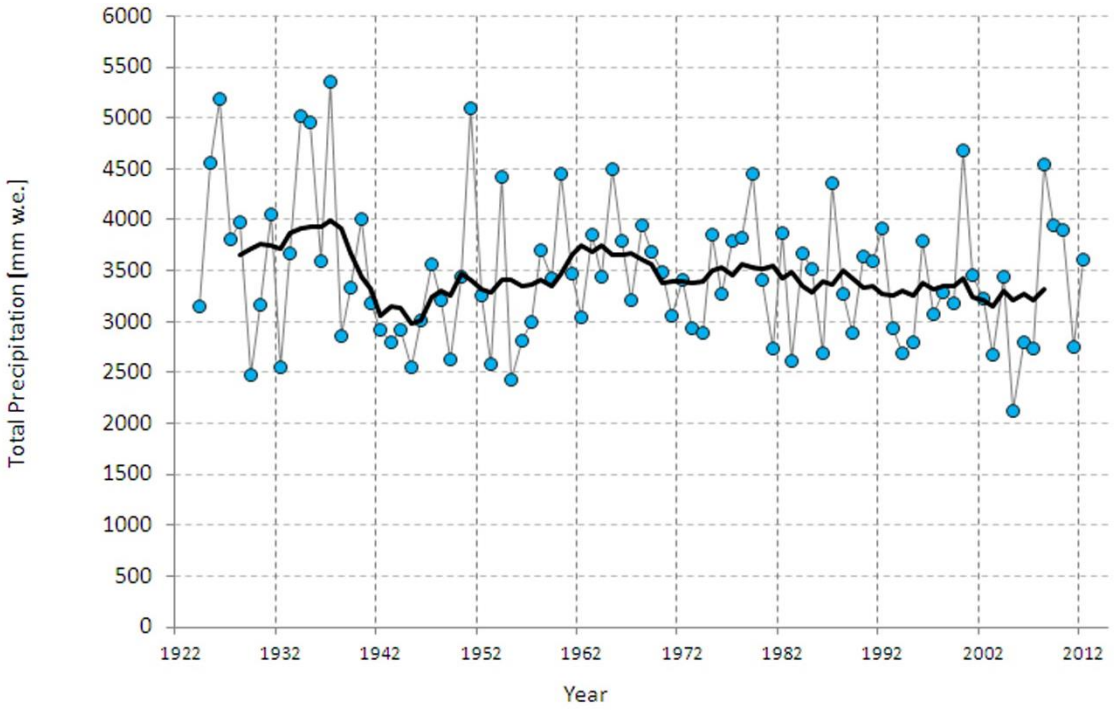
Vrhovec et al., 2004



Isotta et al., 2013



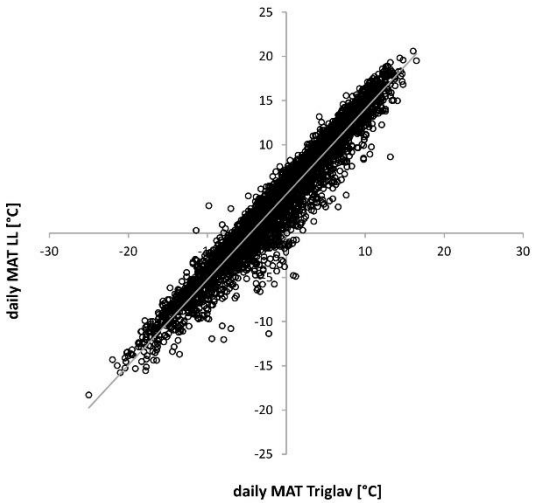




Precipitation reconstruction 1924-2012

Based on 5 valley weather station around Mt. Canin

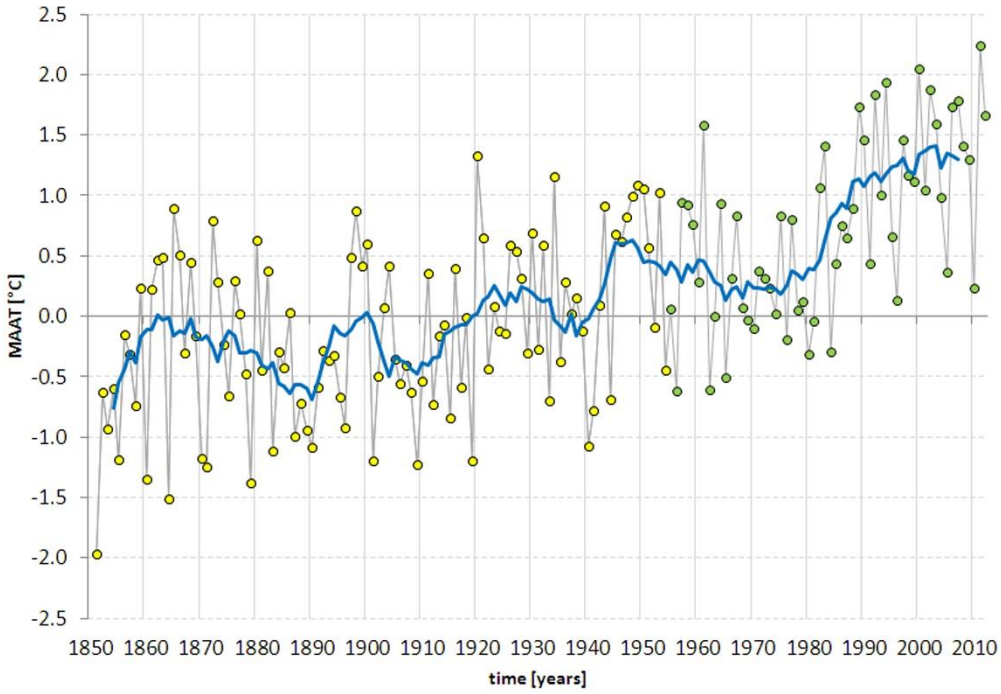
Colucci & Guglielmin, (2015) Int. Journal Clim.

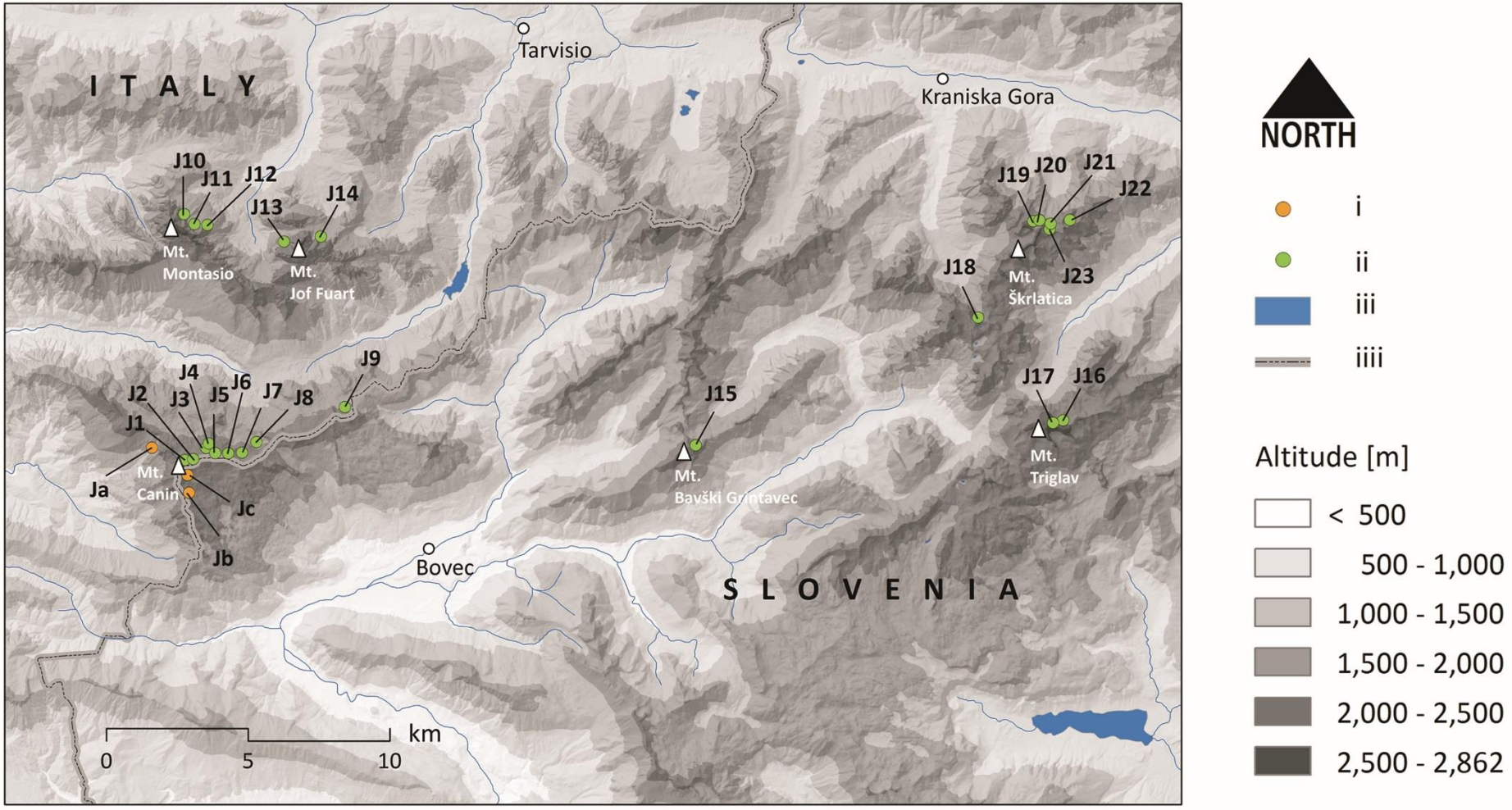


B → temperature reconstruction at the elevation of 2200 m 1851-2012

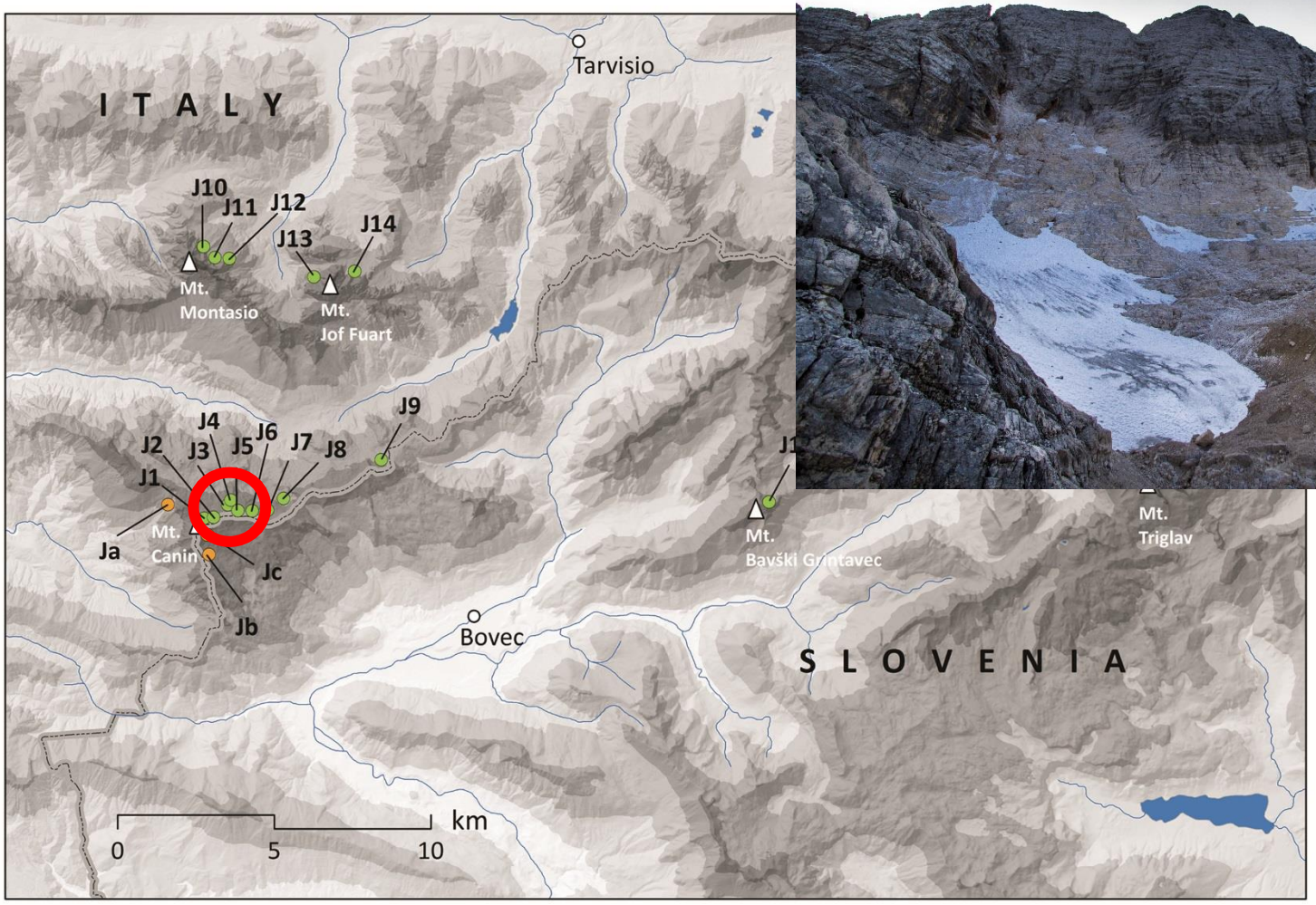
Based on 2 mountain station
(f) Villacher Alpe (2120 m) – Austria
(e) Triglav (2514 m) – Slovenia

Colucci & Guglielmin, (2015) Int. Journal Clim.





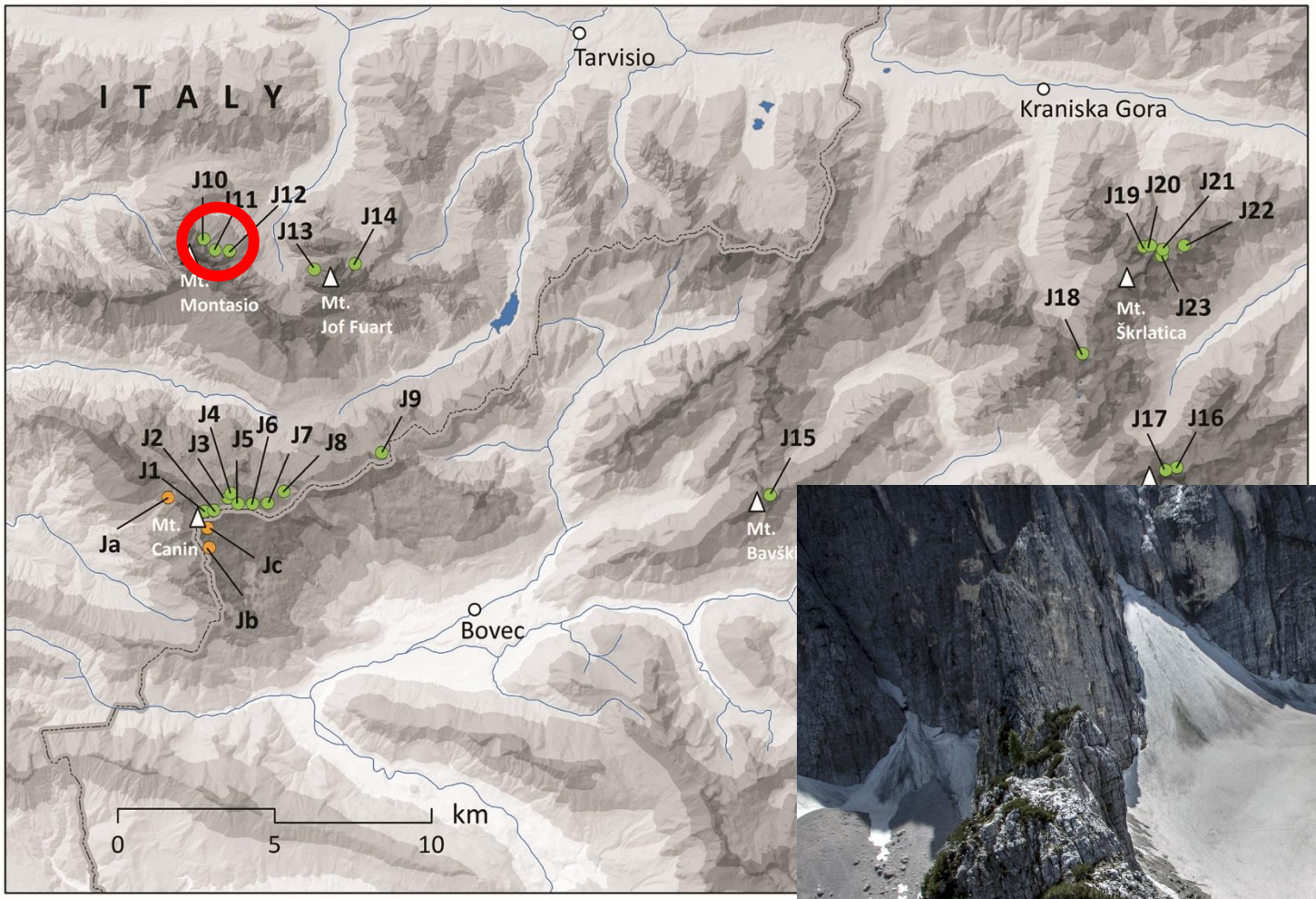
Colucci (2016). Geomorphic influence on small glacier response to post Little Ice Age climate warming: Julian Alps, Europe. Earth Surface Processes and Landforms



Altitude [m]

- < 500
- 500 - 1,000
- 1,000 - 1,500
- 1,500 - 2,000
- 2,000 - 2,500
- 2,500 - 2,862

Colucci (2016). Geomorphic influence on small glacier response to post Little Ice Age climate warming: Julian Alps, Europe. Earth Surface Processes and Landforms



NORTH

i

ii

iii

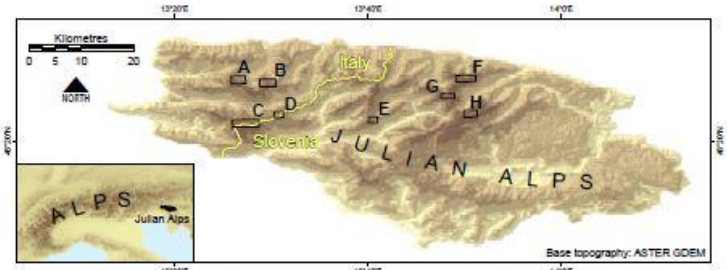
iiii

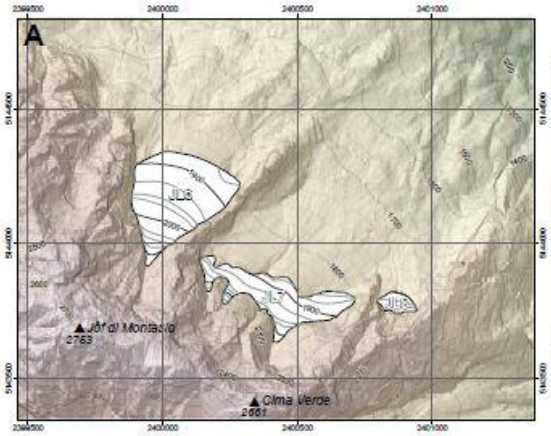
Colucci (2016). Geomorphic influence on small glacier respo
Earth Surface Processes and Landforms

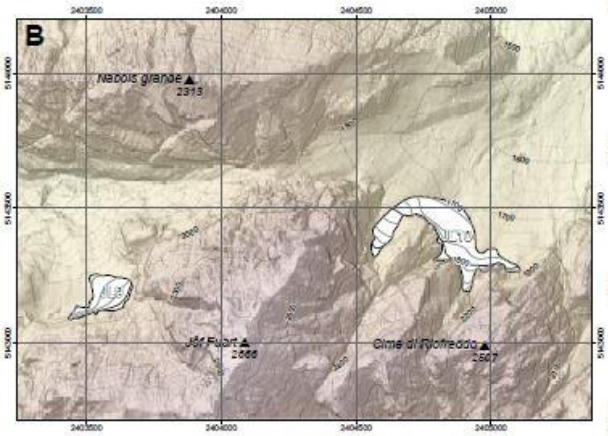
Glacial evolution in the Julian Alps since the Little Ice Age

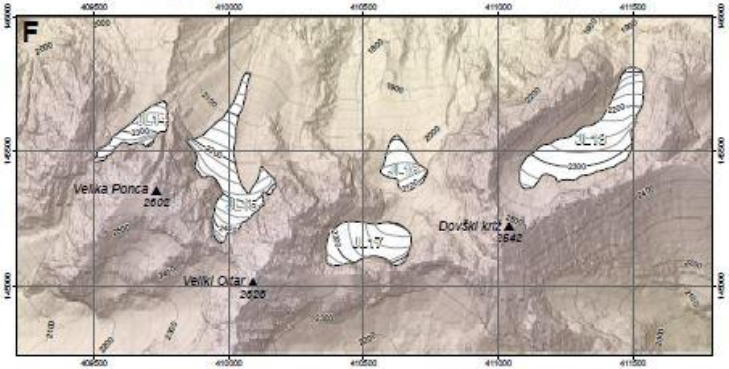
Renato R. Colucci [1] & Manja Žebre [2]

[1] Department of Earth System Sciences and Environmental Technologies, ISMAR-CNR, Viale Romolo Gessi 2, 34123 Trieste, Italy; r.colucci@ts.ismar.cnr.it
[2] Geological Survey of Slovenia, Dimičeva ulica 14, 1000 Ljubljana, Slovenia; manja.zebre@geo-zs.si







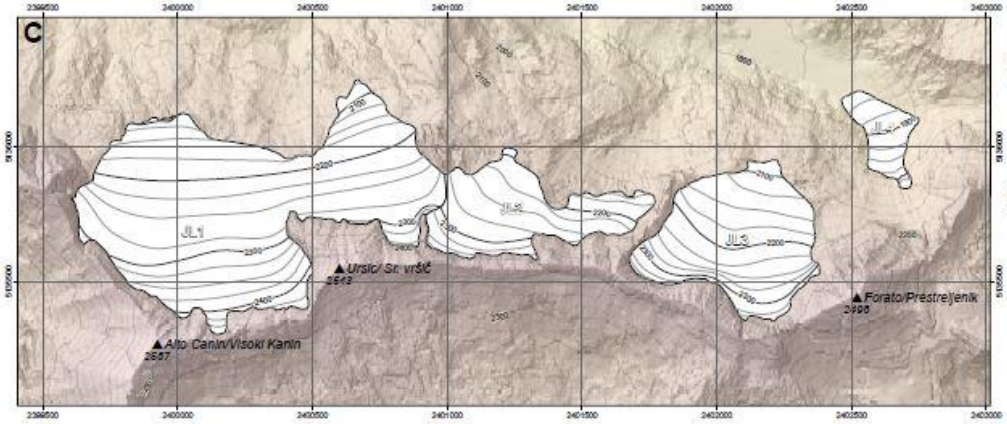


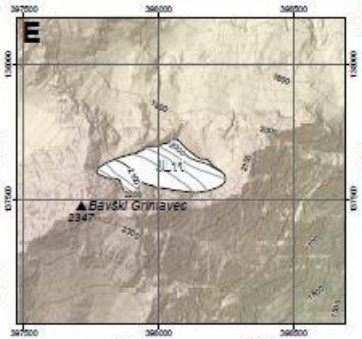
Metres
0 250 500 1.000 1.500

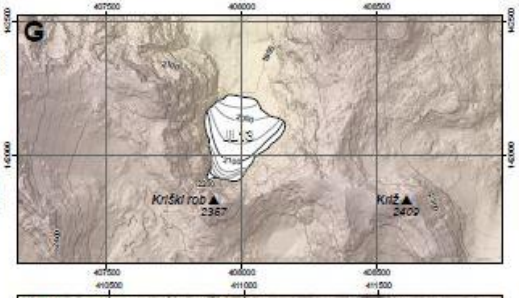
Scale 1:6.000

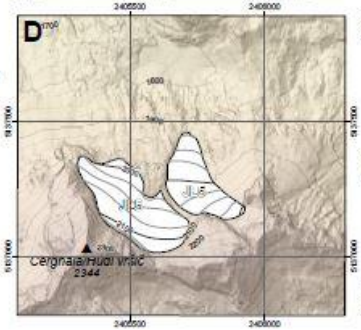
NORTH

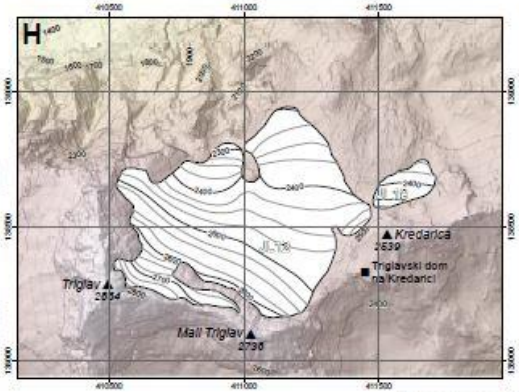
Coordinate system of maps A, B, C, D: Monte Mario Italy 2;
Projection: Transverse Mercator; Datum: Monte Mario
Coordinate system of maps E, F, G, H: D96 Slovenia;
Projection: Transverse Mercator; Datum: Slovenia Geodetic Datum 1996











Legend

Glacier extent in the Little Ice Age

Base topography of maps A, B, C, D: LiDAR data Italy 2006, Civil Defence of Friuli Venezia Giulia

Base topography of maps E, F, G, H: LiDAR data Slovenia 2014-2015, Geodetic Institute of Slovenia

Area of glaciers in the Little Ice Age and loss of glacier volume since the Little Ice Age

ID	Name	Area [km²]	Volume [km³ 10⁻³]	ID	Name	Area [km²]	Volume [km³ 10⁻³]
JL1	Canin	0.678	27.9	JL11	Bavški Grintavec	0.058	1.9
JL2	Ursic	0.180	2.7	JL12	Zeleni sneg - Triglav	0.442	13.8
JL3	Prestreljenik	0.259	4.9	JL13	Kmica	0.063	1.7
JL4	Prevala	0.051	0.5	JL14	Ponca North	0.022	0.4
JL5	Cergnala	0.125	2.0	JL15	Ponca East	0.068	1.2
JL6	Montasio West	0.100	2.9	JL16	Low Oltar	0.020	0.2
JL7	Montasio East	0.063	1.3	JL17	High Oltar	0.042	0.8
JL8	Montasio Minor	0.008	0.1	JL18	Dovški križ	0.083	1.9
JL9	Studence	0.020	0.3	JL19	Kredarica	0.025	0.4
JL10	Carnizza - Riofreddo	0.061	1.0				

Glacial evolution in the Julian Alps since the Little Ice Age

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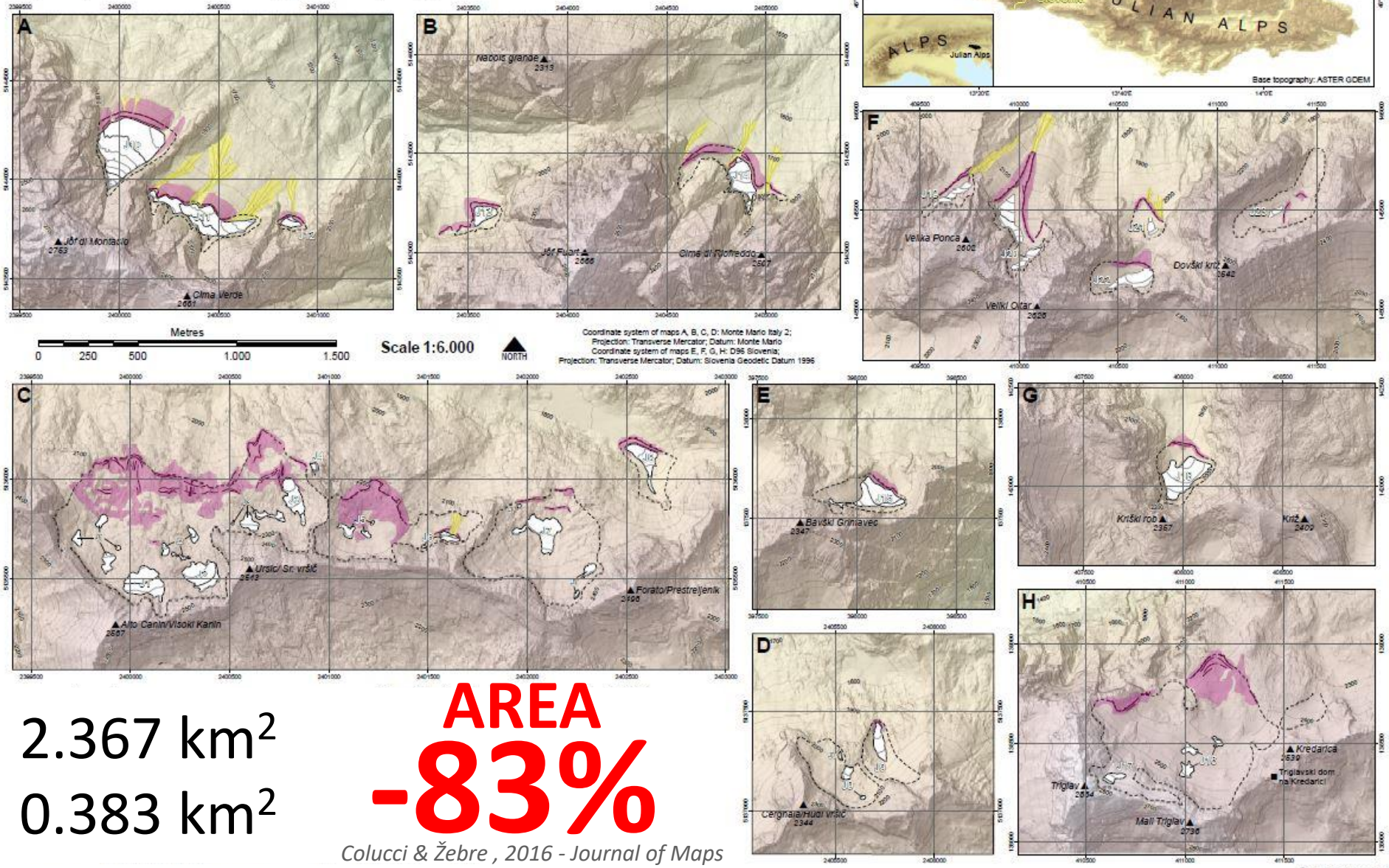

2.367 km²

0.383 km²

AREA

-83%

Colucci & Žebre , 2016 - Journal of Maps

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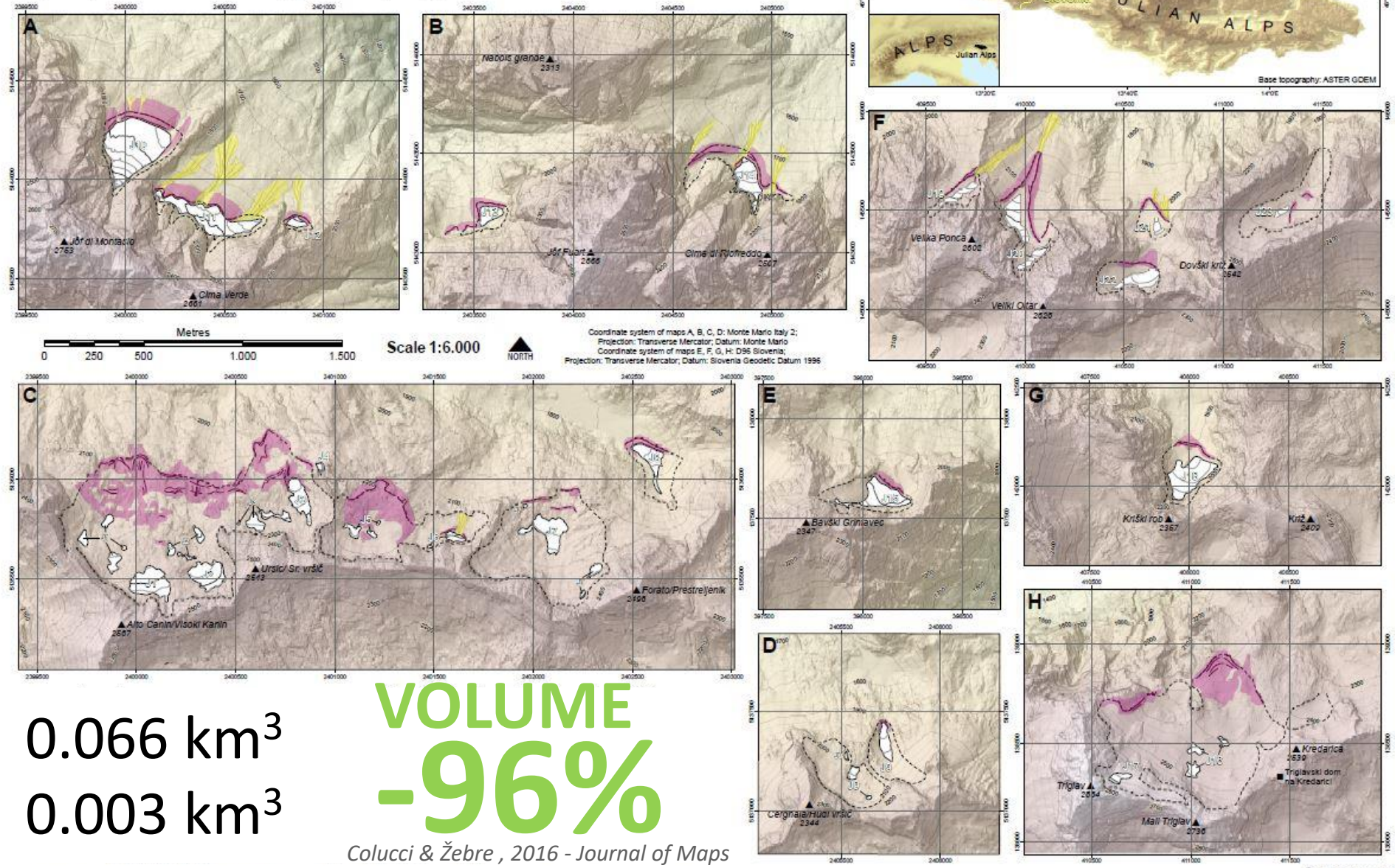

0.066 km^3

0.003 km^3

VOLUME

-96%

Colucci & Žebre , 2016 - Journal of Maps

The Canin massif – **Julian Alps**

Cryo caves distribution → 3068 caves > 1000 m asl
1111 CRYO caves of which 123 (11%) ICE caves
mainly between 1500-2200 m
mean el. 1838 m, median el. 1888 m

Canin massif
Highest cryo cave percentage
- 751 cryo caves
- 79 ice caves

Median elevation 1928 m asl
→ 991 cryo caves considering also the Slovenian side of Canin