

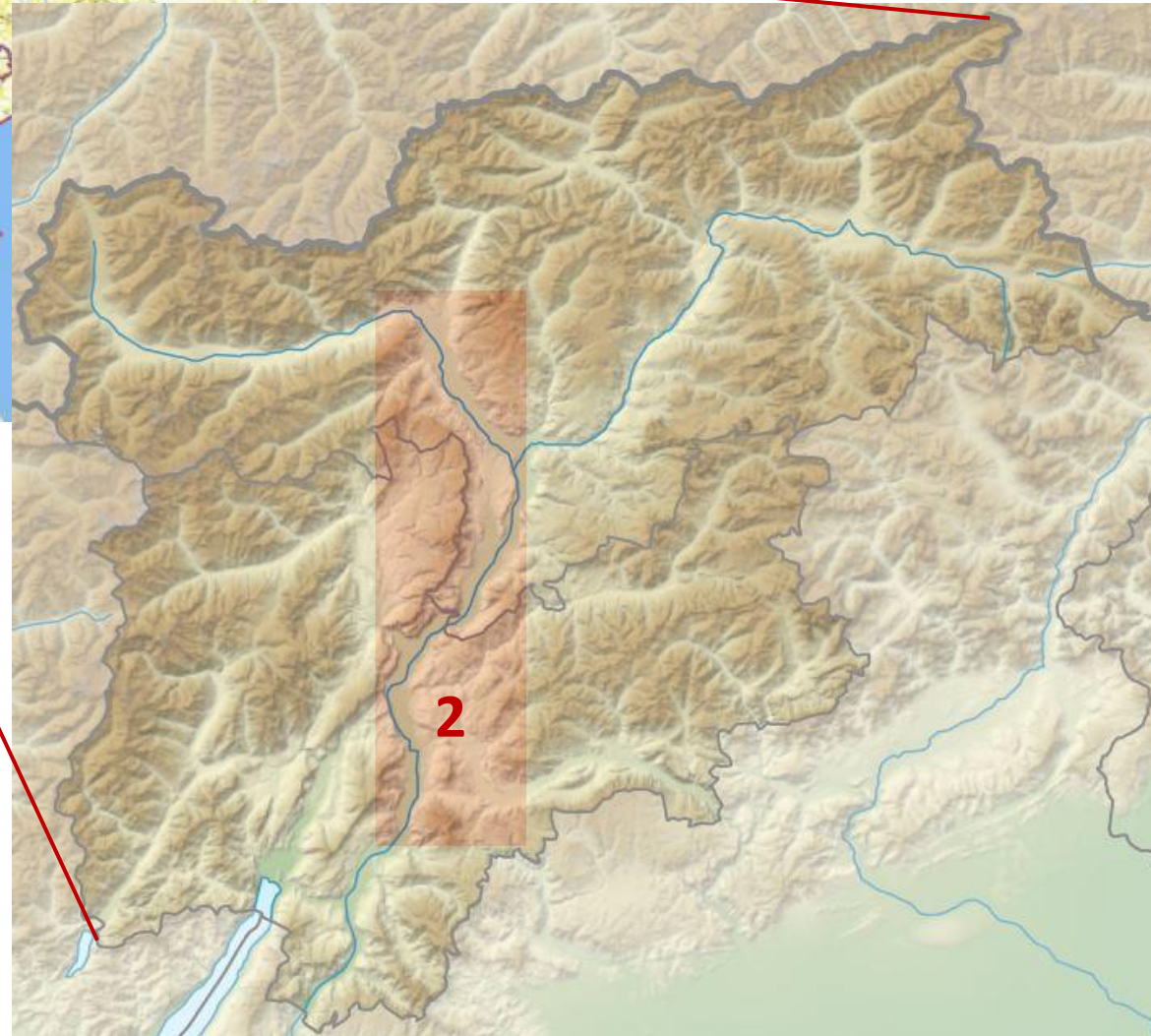


Who needs *Mitteleuropa* old maps?

Present-day applications of Habsburgic cartographic heritage

Marco Mastronunzio, Elena Dai Prà

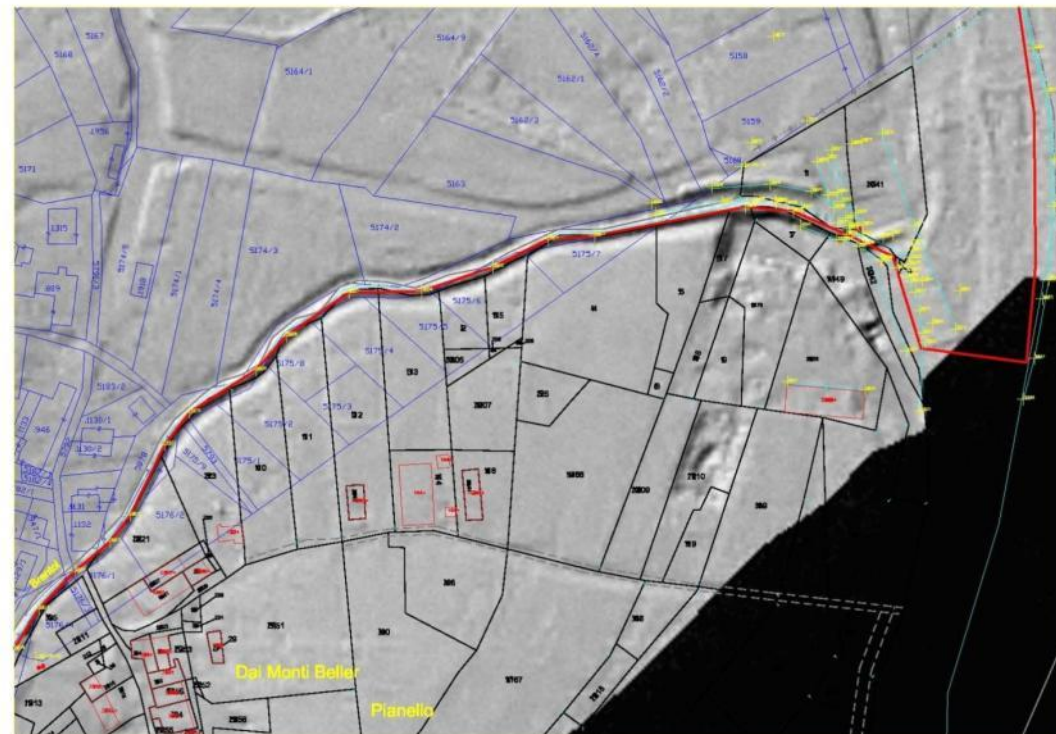
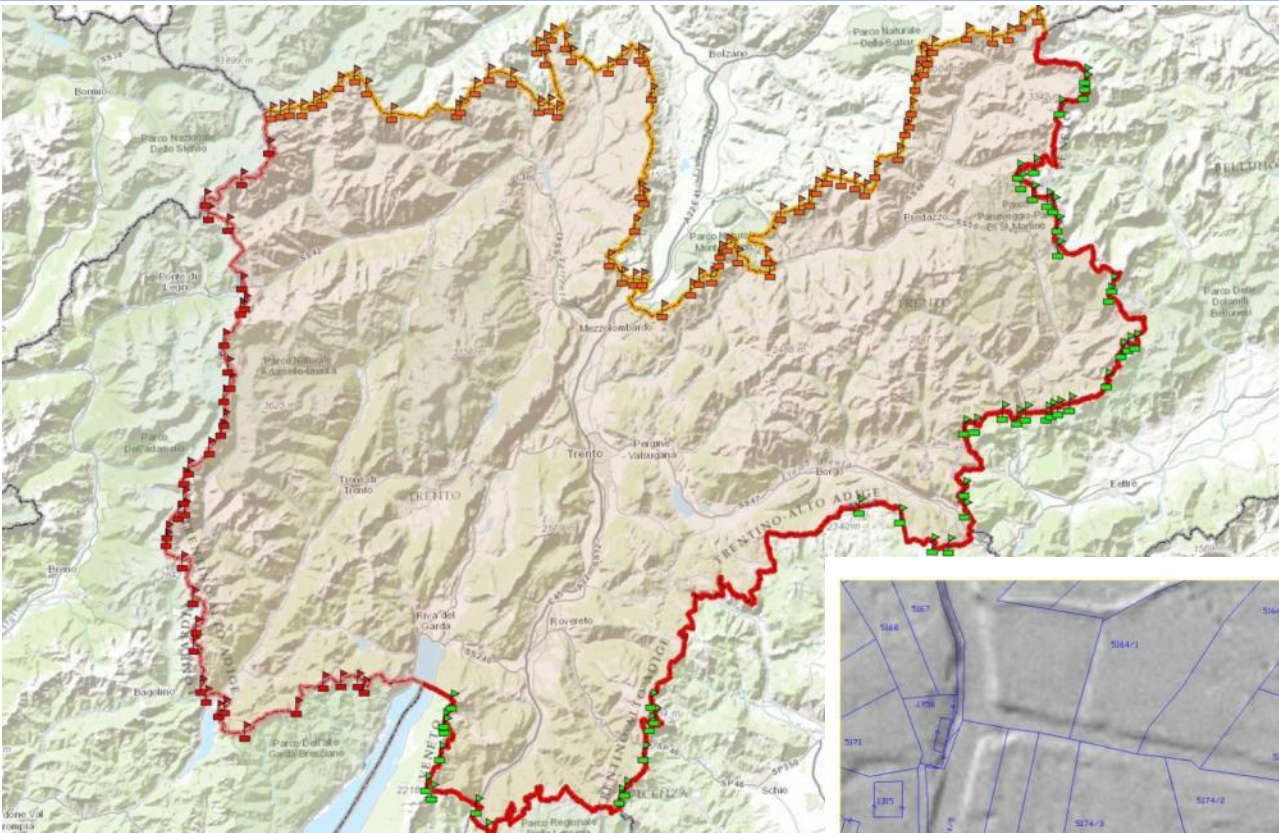
University of Trento, Department of Humanities, mastronunzio@gmail.com



RESEARCH PROJECTS

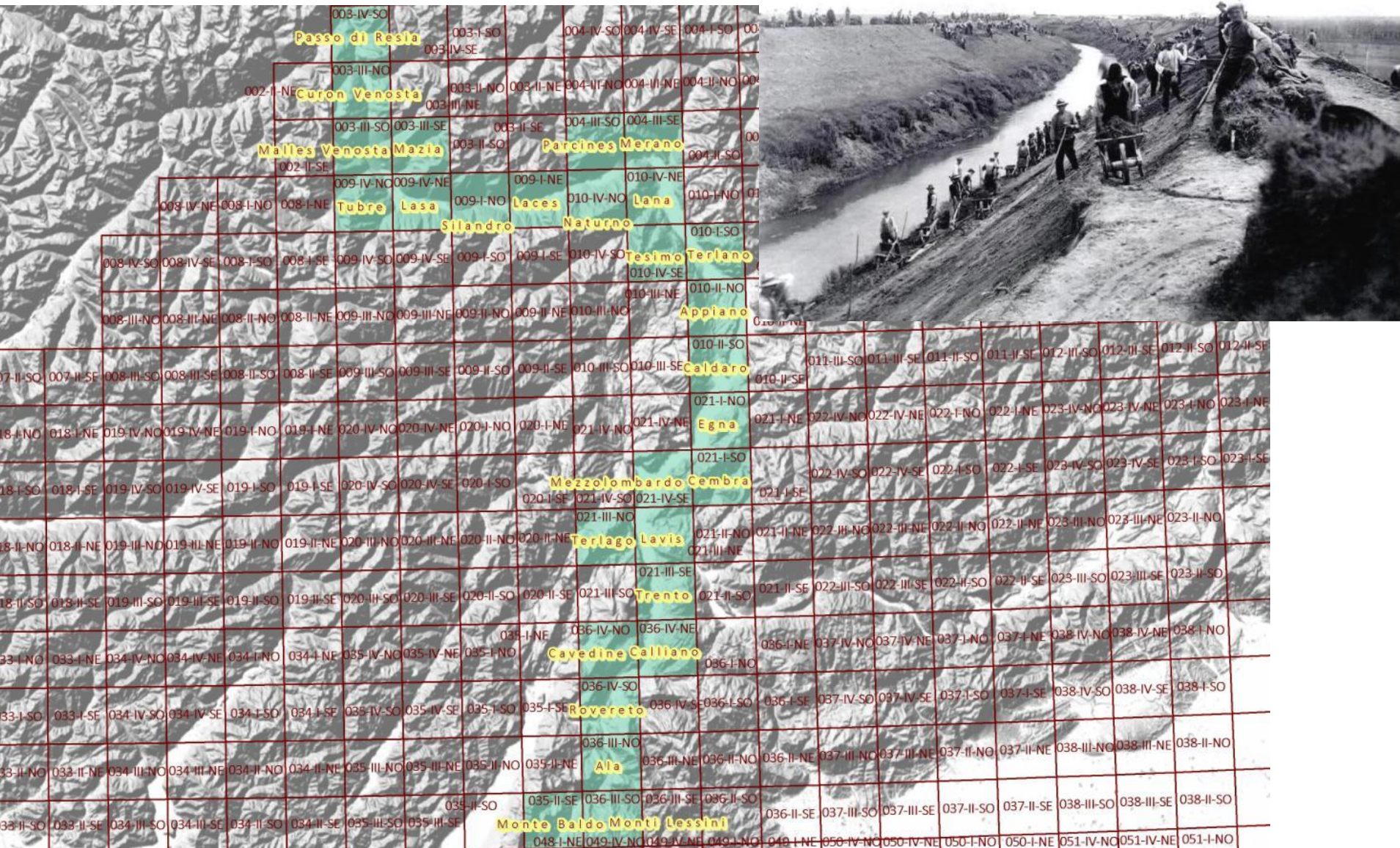
1. Historical boundaries

2. ETSCH2000



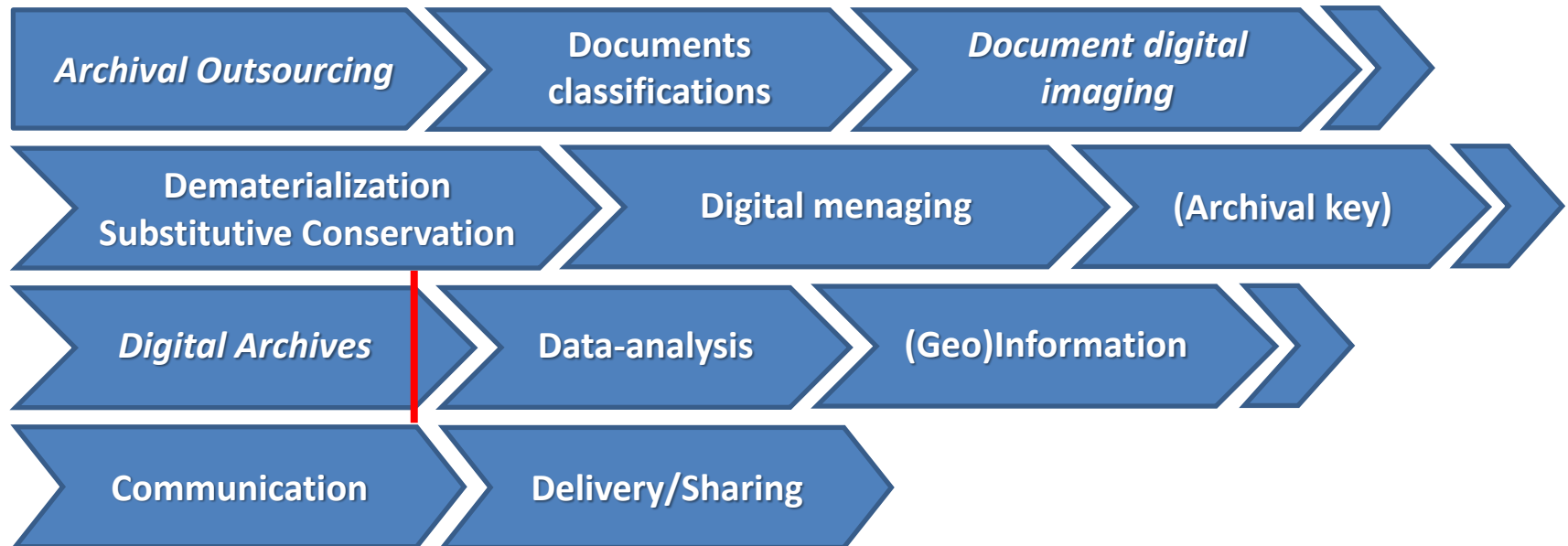
**Historical boundaries:
current disputes (180)**

ETSCH2000: change detection



1. The Problem

Workflow

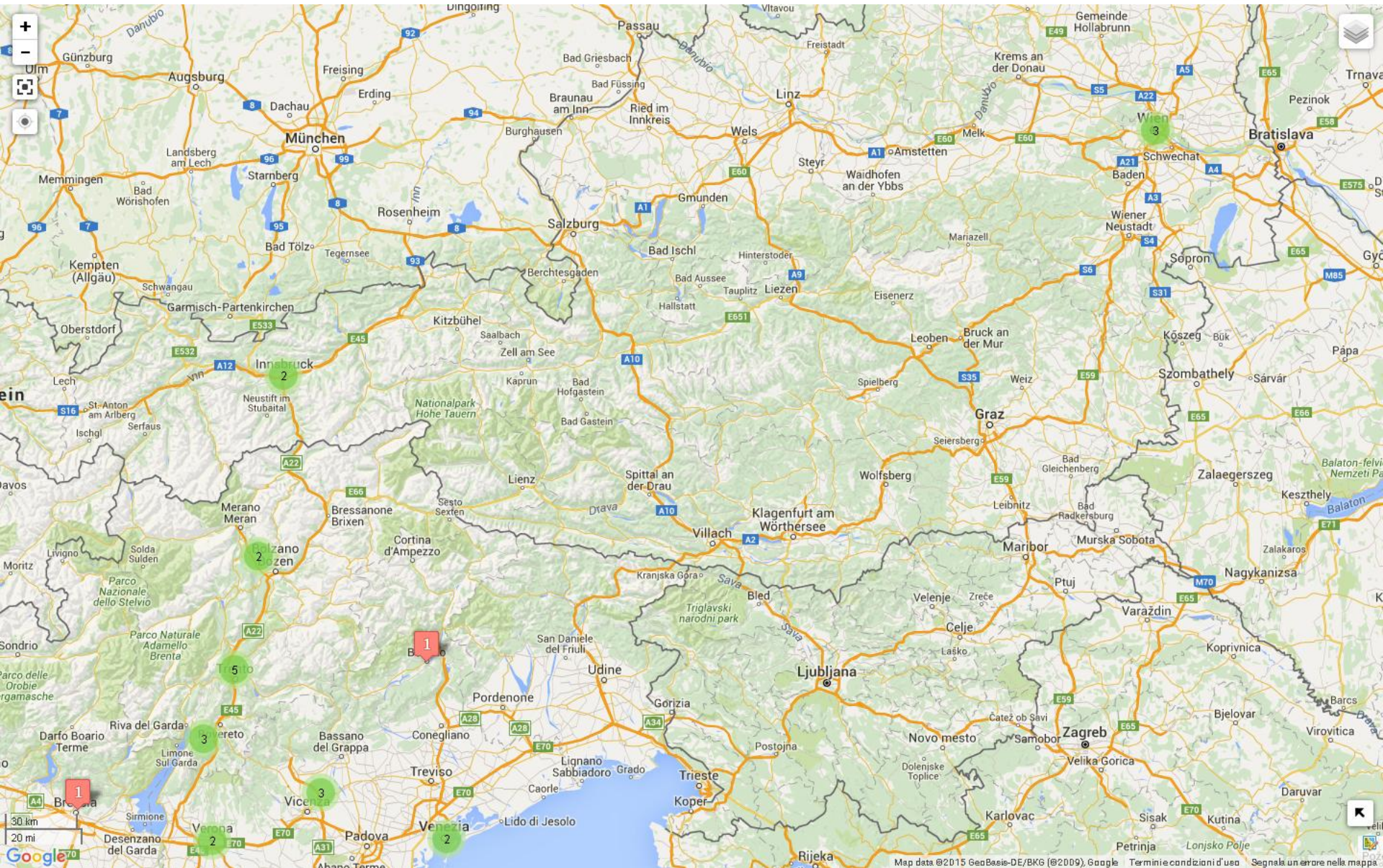


2. The (Real) Problem *Paper Maps!*

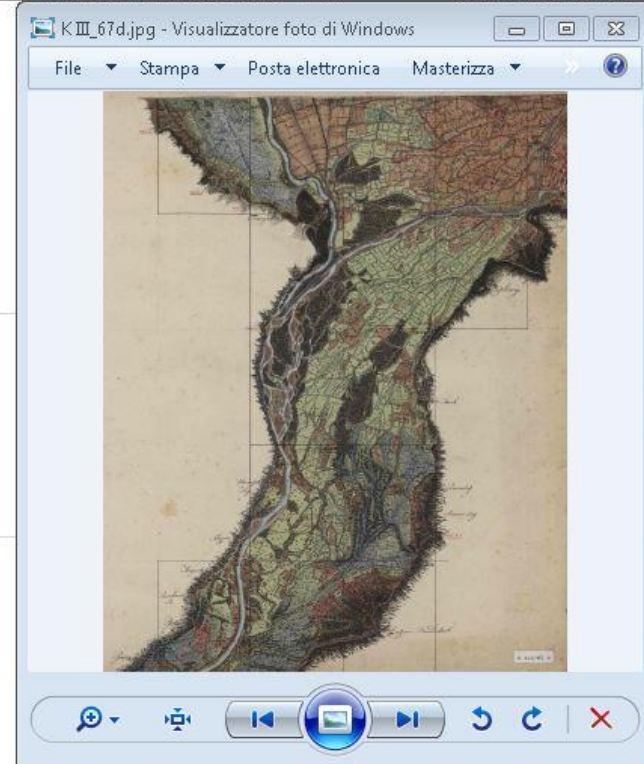


Big-Data!





ID	Data	Titolo	Alias	Autore/i	Scala	Toponimo	Idronimo	Copertura	Fogli-mappa	Quadro d'Unione	Georeferencing	Nota	Archivio	Fotoriproduzione	IPES
13	1801-1820	<i>Reduktion der Spezialkarte von Tirol</i>		KuK Generalquartiermeisterstab	72000 (1 Zoll = 2500 Schritte)	Tirol (completa)	Adige, Val d'Adige, Passiria, Fersina, Avisio, Nace, Isarco, Lena	Adige (completa); Passo di Resia-Borghetta; non solo perfluviale ma integrale	49						
14	1803-1805	<i>(Hydrologische) Oeconomische Karte des Etschstromes und der umliegenden Gegend in der Grafschaft Tirol in 131 Sectionen [...]</i>	Nowack-Plan	Nowack	3456	Tirola, Castel Tirola/Schloss Tirol, Besenella	Adige, Val d'Adige, Passiria, Fersina, Avisio, Nace, Isarco, Lena	Val d'Adige; corso del fiume e del land cover perfluviale da Lagundo/Algund a Besenella; Val Venosta esclusa	131						Landesbibliothek Innsbruck
15	1803	<i>Oeconomische Karte des Etsch Landes</i>	Nowack ridotta	Nowack	100000 ca. (1 Zoll = 1500 Fortifications Klafter)	Tirola, Castel Tirola/Schloss Tirol, Besenella	Adige, Val d'Adige, Passiria, Fersina, Avisio, Nace, Isarco, Lena	Val d'Adige; corso del fiume e del land cover perfluviale da Lagundo a Besenella; Val Venosta esclusa	131 (7)						K III 67d
								vestizione dettagliata) da Salorno a Besenella							
16	1805	<i>Hydrologisch Oeconomische Karte des Etsch</i>	Nowack Mezzocorona	Nowack	3456	Cortina, Salorno, Roverè, San Michele,	Adige, Val d'Adige, Nace	Val d'Adige; corso del fiume e del land cover	21	Sì	No	mappa idratopografica con rappresentazione	ACM	Sì	Mezzocorona



Multiscale
1:1.440 → 1:75.000
Time series
1752 → (1914) → Google Map Era

Inventar	Jahr	Gebiet, Ortsname	Verso	Grenzen	Autoren	Anmerkungen, Blätter Franziszeische Kat.	Dip.	APTN	Mancante APTN	AdSBL	Idrografia	JPEG
K60/111	16.05-04.08.1812	Villagrande		Laste, Selva, Pian Fossale (K60/195)		2.000 grande formato ma incompleta solo colori fu						K60/111
K60/112	14.04-03.06-1813	Mis, Miss	39/II.A.20		Ing. Isp. Gaetano Grisi; Geom. Antonio Calovini	Acquisita nel 2011						K60/112
K60/113	16.04-30.06.1813	"Mappa Originale del Territorio di Castello della Pietra Sezione di Tonadigo"	24/II.A.5; n. 89/a, 89/b	Mis, Tonadigo, "Territorio dei Canali"	Ing. Isp. Gaetano Grisi	2.000 grande formato 24						
K60/114	13.04-25.07.1813	"Mappa originale del territorio di Immer e Masi uniti"	34/II.A.15	"Fiume Cismone"	Ing. Isp. Gaetano Grisi	2.000 medio formato (ca mappa 1-2-3-4-5 di Imer						K60/114
K60/115	26.06-31.07.1813	"Mappe Originale del Territorio di Vaoz con Pieraclocchia Sezione di Arabba Comune di Livinallongo"	n. 60 Vaoz; 16/I.16	Confina con la 121; Regno di Baviera Confine del Territorio di PIGlardena"		2.000 formato grande 19 confinanti in stampatello Regno di Baviera differen Nord a colori						
K60/116	12.04-18.07.1813	Fiera, Pieve, Transaqua (sic).		Tonadigo, Tonadighi, Villa di Osne, Villa di Mezzano, Siror	Ing. Isp. Gaetano Grisi, Geom. Antonio Vincenzo Grisi	2.000 formato molto gra rosa fabbricati, verde rig sfumato grigio versante, az Comuni; particelle non topologia) con austriaco distrettuale; inizio nume maiuscole per ed. culto; 5-5ad-6-7-11-12 di Transa della Direzione (vedi 199						
K60/117	08.05-10.08.1812	"Mappa Originale Salesei Sezione di Pieve di Livinnallongo"	n. 66; 13/I.13	Palla e Aguai, Laste, Larzonei, Pieve, Andraz	Ing. Isp. Gaetano Grisi, Geom. Antonio Zanella	2.000 formato medio-gra del monte colle di Lana"						K60/117
K60/118	17.04-31.05.1813	Varda	n. 91; VIII Varda; 17/I.17			2.000 formato medio-gra						
K60/119	25.05.1813	Soraruaz Fraz. del Com. di Livinallongo, Ruaz, Pezzà, Fossel, Crepez, Renaz		Varda, Orneal, Charz, Corte Fraz. del Com. di Livinallongo	Ing. Isp. Gaetano Grisi	2.000 grande formato co conf. vedi 141; verificare 141						K60/119
K60/120	04.07-31.07.1813	"Mappa Originale del Territorio di Val Parola Frazione di Castello di Andraz"	15/I.15; n. 2 Comune di Livinallongo; n. 56		Ing. Isp. Gaetano Grisi; geom. Francesco Croselli	2.000 formato medio 200 Baviera differente (croce						



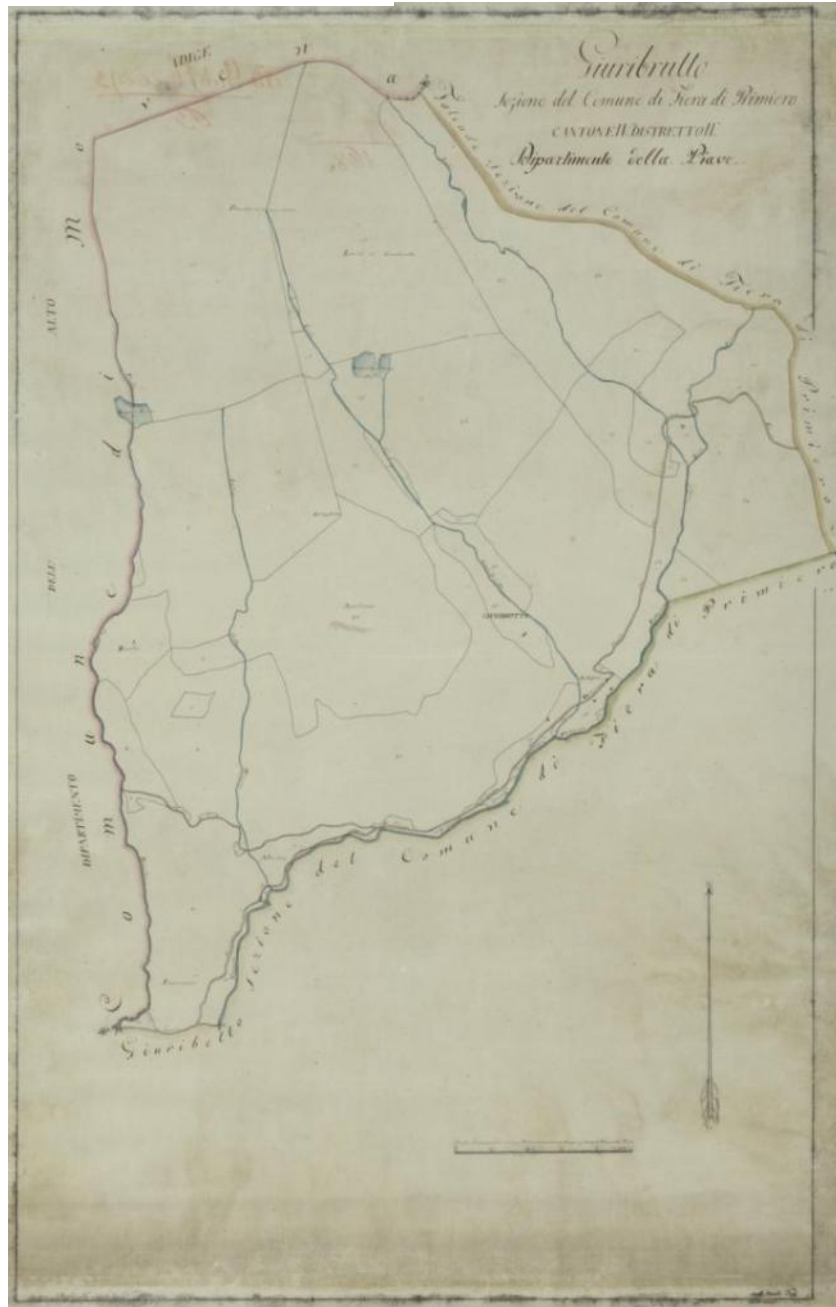
Single map-sheet



Mappa ichnografica del corso dell'Adige e Fersina nei contorni di Trento 1777

G.B. Scotini, cm 201x78

Trento, Museo Provinciale d'Arte



NO map-sheets overview (index-map)

200 map-sheets
Index-map *EDITED* with a
comparative approach

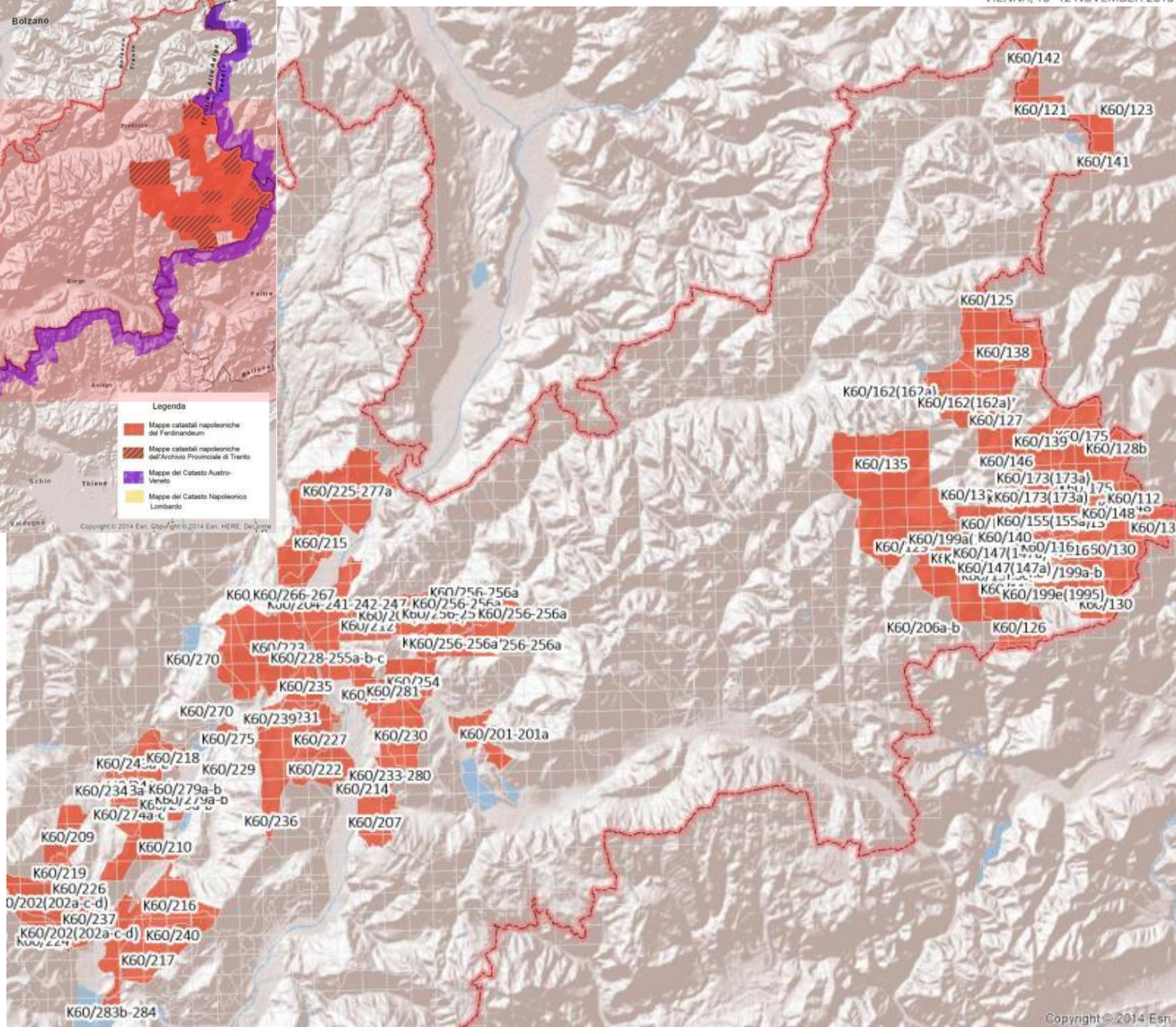
Napoleonic Cadastre
(*Napoleonischen Steurkataster*)

1809-15

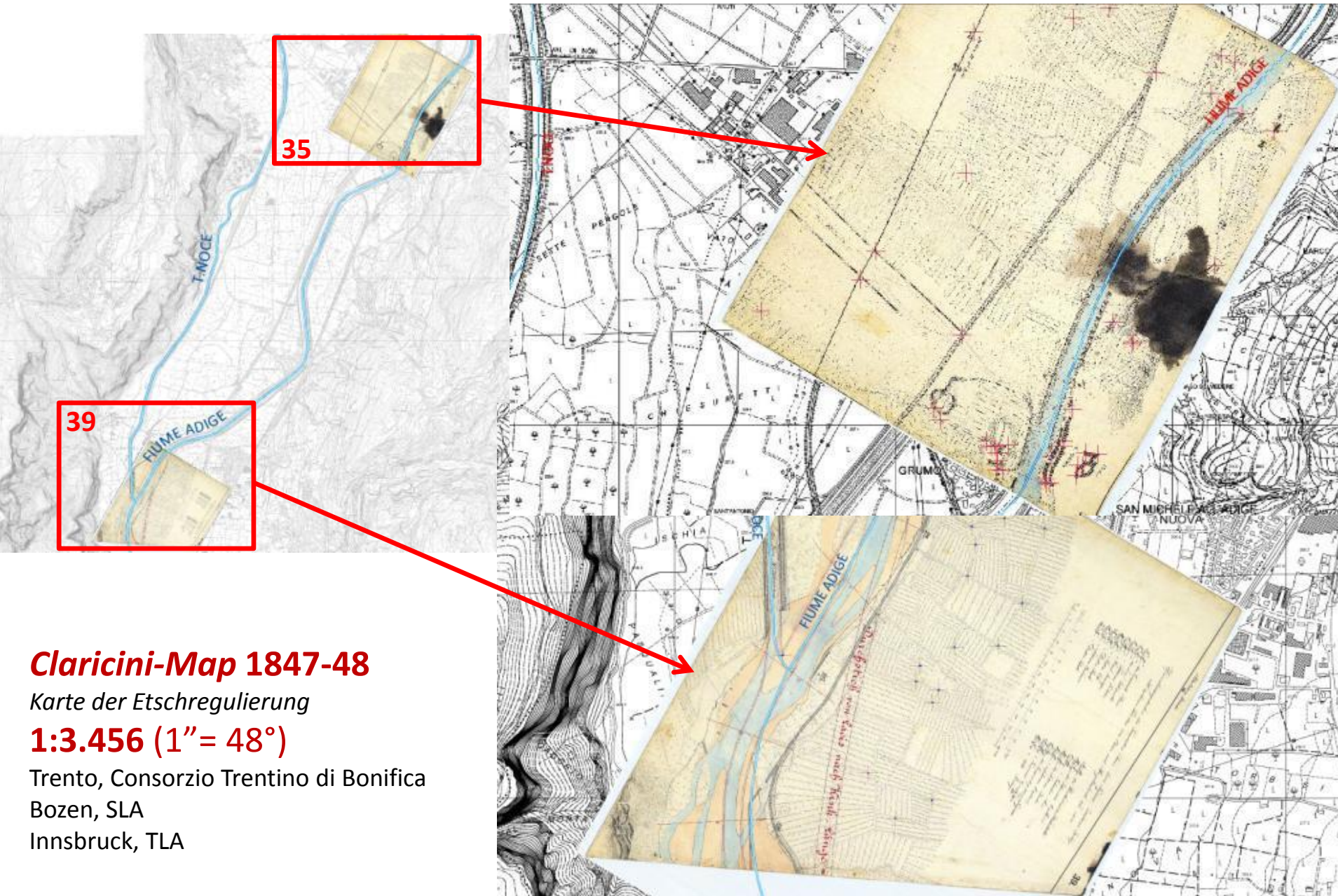
1:2.000

Innsbruck, TLMF





NO index-map: 58 map-sheets Index-map NOT edited



Claricini-Map 1847-48

Karte der Etschregulierung

1:3.456 (1" = 48°)

Trento, Consorzio Trentino di Bonifica

Bozen, SLA

Innsbruck, TLA

French scale (and measures) for Habsburgic Maps

1 ligne = ca. 2,2 mm
 12 ligne = 1 inch/Zoll
 12 inches = 1 foot
 6 foot = 72 inches = 1 Fathom/Toise/Klafter
 1 Wiener Klafter = 1,896 m
 1 Fortifications Klafter/Toise de Paris = 1,949 m

Carte particulière des environs de Paris
 Jean Picard, 1678

une ligne pour 100 toise

$1/(72 \times 12) : 100 = 1/864 : 100 \rightarrow 1:86.400$

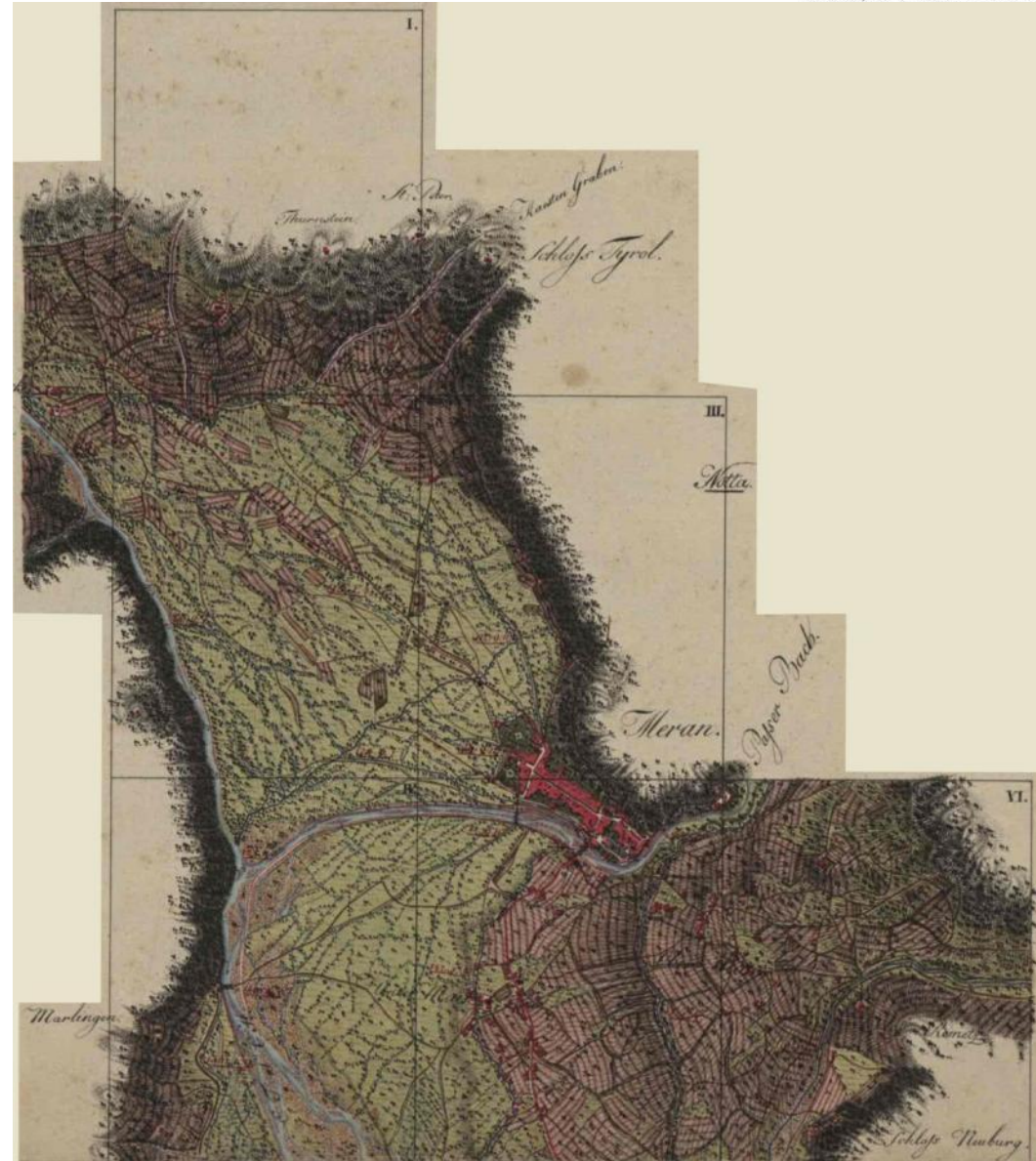
This map-scale «would become the **standard scale for all subsequent regional maps produced by the Cassini**» and the “**base**” scale for all Habsburgic maps (till the “third military survey”)

«The base line could now be constructed, using wooden rods each measuring 2 *toises* laid end to end over the course of at least 100 *toises*»

French procedures for Habsburgic Maps?

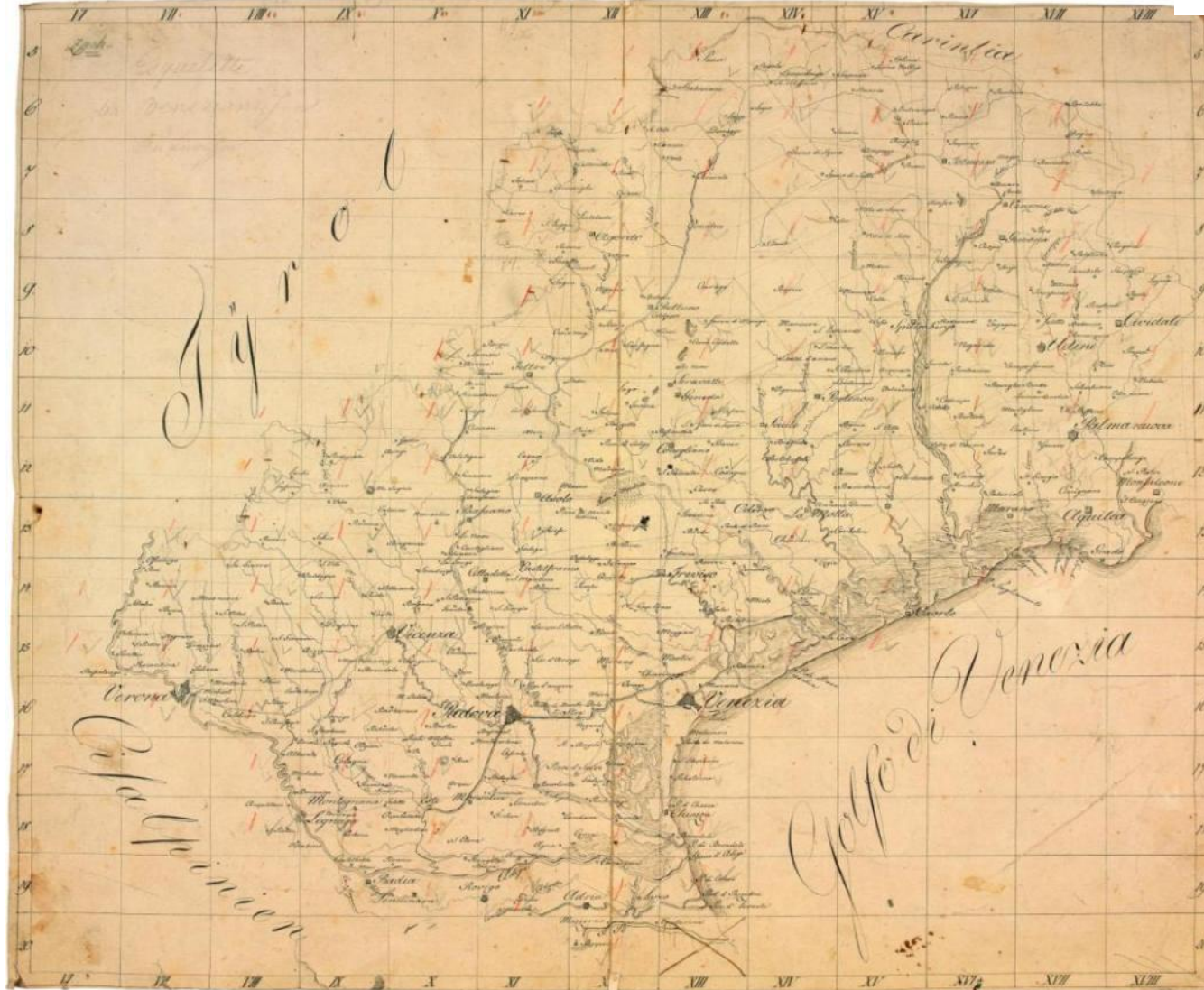
(1811) *Istruzioni della direzione generale del censo ai geometri incaricati della misura dei terreni [...]*

(1824) *Katastralvermessungsinstruktion*



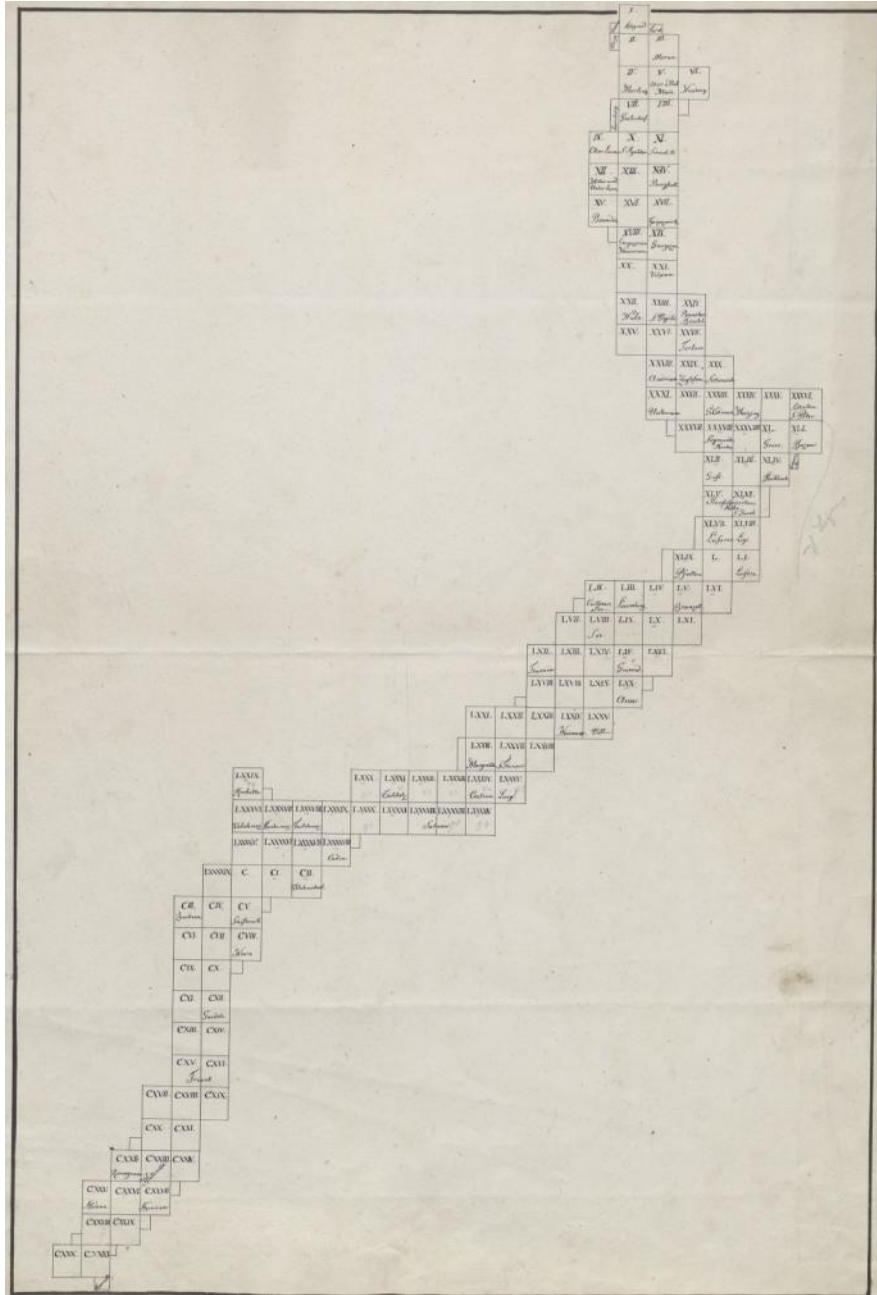
Nowack Map 1803 (Innsbruck, TLMF)

Masstab von 1500 Fortifications Klafter, $1/72 : 1500 = 72 \times 1500 \rightarrow 1:108.000$



Kriegskarte
1798-1805
1:28.800
(1"= 400°)
120 sheets
Wien, KA

Karte des Herzogthum Venedig (Franziseische LA Venetien), in-between 1. LA 1763-87/2.LA 1806-69, No fundamental geodetic survey till 2.LA (Zach ellipsoid 1810/Vienna Datum 1806); plane table/theodolite (topographic/trigonometric survey) using "von Zach triangulation"; Paduaner Meridian/Paralel (triangulation origin, 3-Standlinie); fingierten Meridan/Perpendikel (false easting/northing); Laplace 1802 ellipsoid? (Monatliche Correspondenz [...] 1800-13)



Nowack-Map 1802-05

*Hydrologische-oeconomische Karte des Etsch-Thales sammt
Profils und Niveaucoten, weiters den eingezeichneten Arbeiten
zur Regulierung dieses Flusses vom Schloss Tirol [...]*

1:3.456 ($1'' = 48^\circ$)

131 sheets

Wien, KA

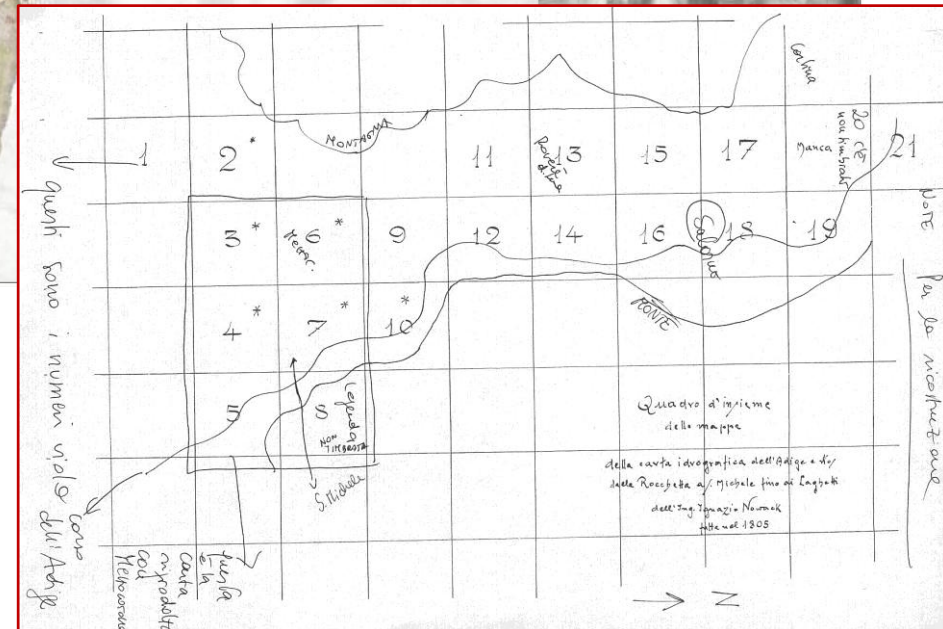
Innsbruck, TLA, TLMF

Mezzocorona (TN)

Like Kriegskarte?



Generated by [MapTiler/GDAL2Tiles](#). Copyright © 2008 [Klokan Petr Pridal](#). [GDAL](#) & [OSGeo](#) [GSOC](#)



This is NOT an *index-map*
(Hand-draft archival sketch-map)

Val Venosta-Map 1817

Hidrotechnische Karte der
Oberr-etsch [...] in Vinschgau

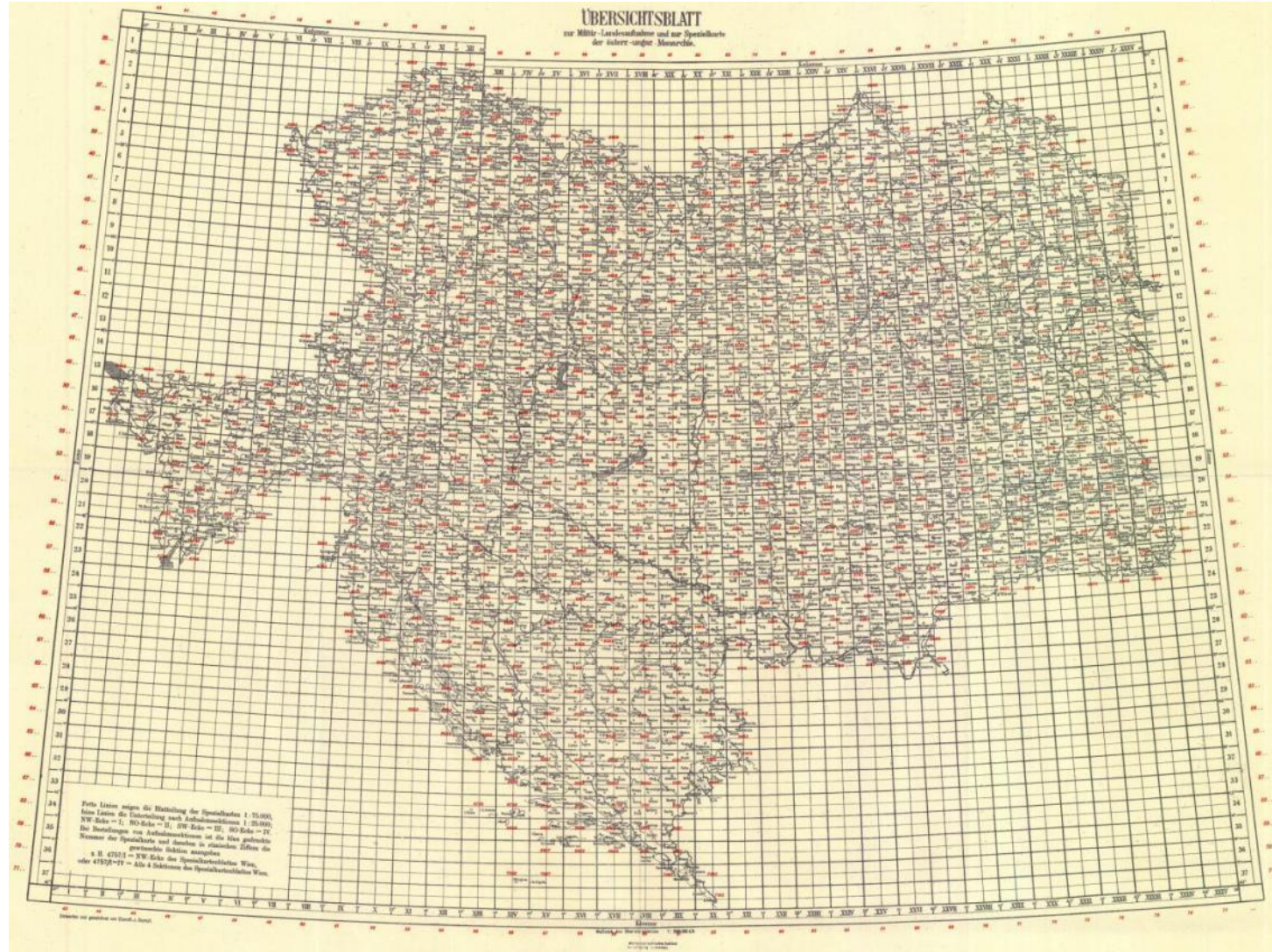
1:3.456

32 sheets

Innsbruck, TLA

Like 2.LA?

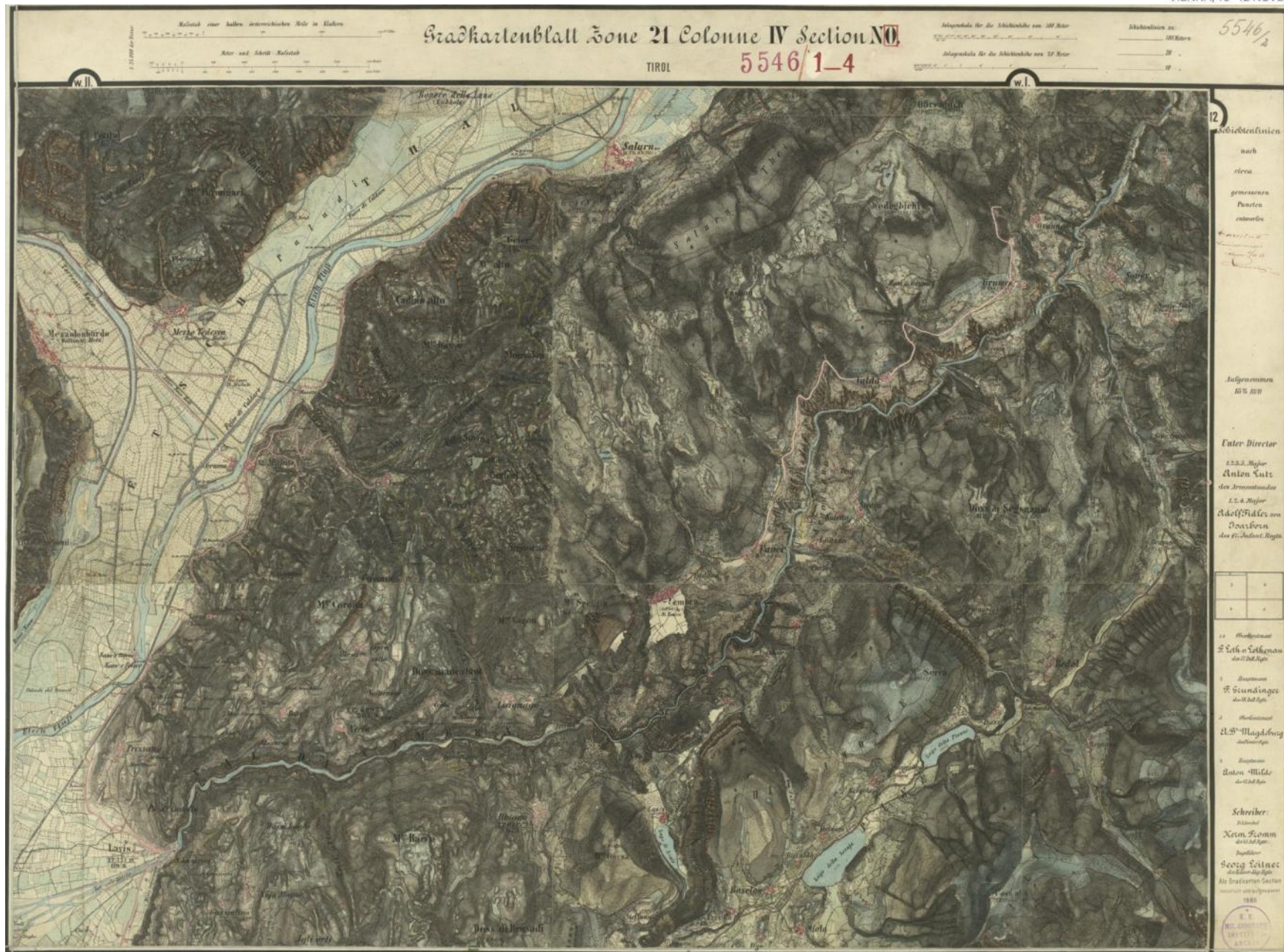




Dritte Landesaufnahme (Franzisco-Josephinische Landesaufnahme/Neue Aufnahme)
1869-1887 (Reambulierung), 1:25.000

Spezialkarte 1871, 1:75.000

Vierte Landesaufnahme (Präzisionsaufnahme) 1904, 1:25.000



1802 Laplace ellipsoid

1806 Vienna Datum (St. Stephan Turm), at least two different definitions, from Ferro, originally with different shift Ferro-Greenwich, then in the 3.LA with the Albrecht-deviation

1809 Bohnenberger ellipsoid, Zach ellipsoid

1810 Zach-Oriani ellipsoid

[...] Innsbruck Datum (Pfarrturm), at least two different definitions, from Ferro

1841 (adopted in 1863), Bessel ellipsoid

1871 Hermannkogel Datum, from Greenwich

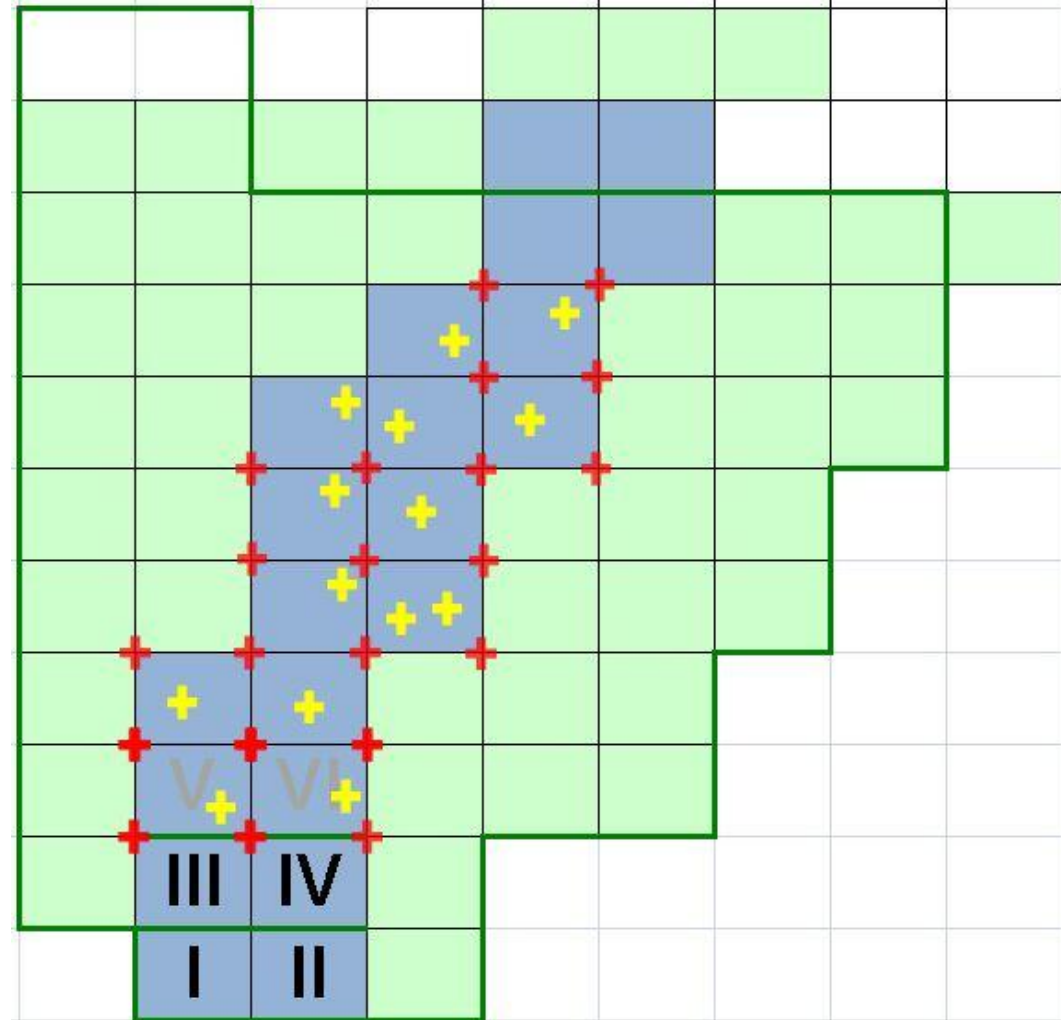
1901 MGI Datum (the fundamental point of MGI datum is Hermannkogel), from Ferro



Further research: “own” geodetic basis of a common set of maps, not comparison between maps

6-steps map-to-map workflow

1. assign to index-maps original CRS
2. longitude rotation Ferro to Greenwich
3. geographic datum transformation to WGS84 (Position Vector 7 parameters)
4. (for earlier Datum) if parameters are not provided: rototranslation parameters calculation using pairs of CP derived from “comparable” maps (simplified Molodenski)
5. reproject in ETRF89 UTM
6. georeferencing with 4-**corners** (derived from index-map) + 1(2) GCP shifting (zero-order)



Example on not-georeferenced 43 map-sheets (1:3.456)

Standard georeferencing = ca. 10 GCP x 43 = ca. **430 GCP**

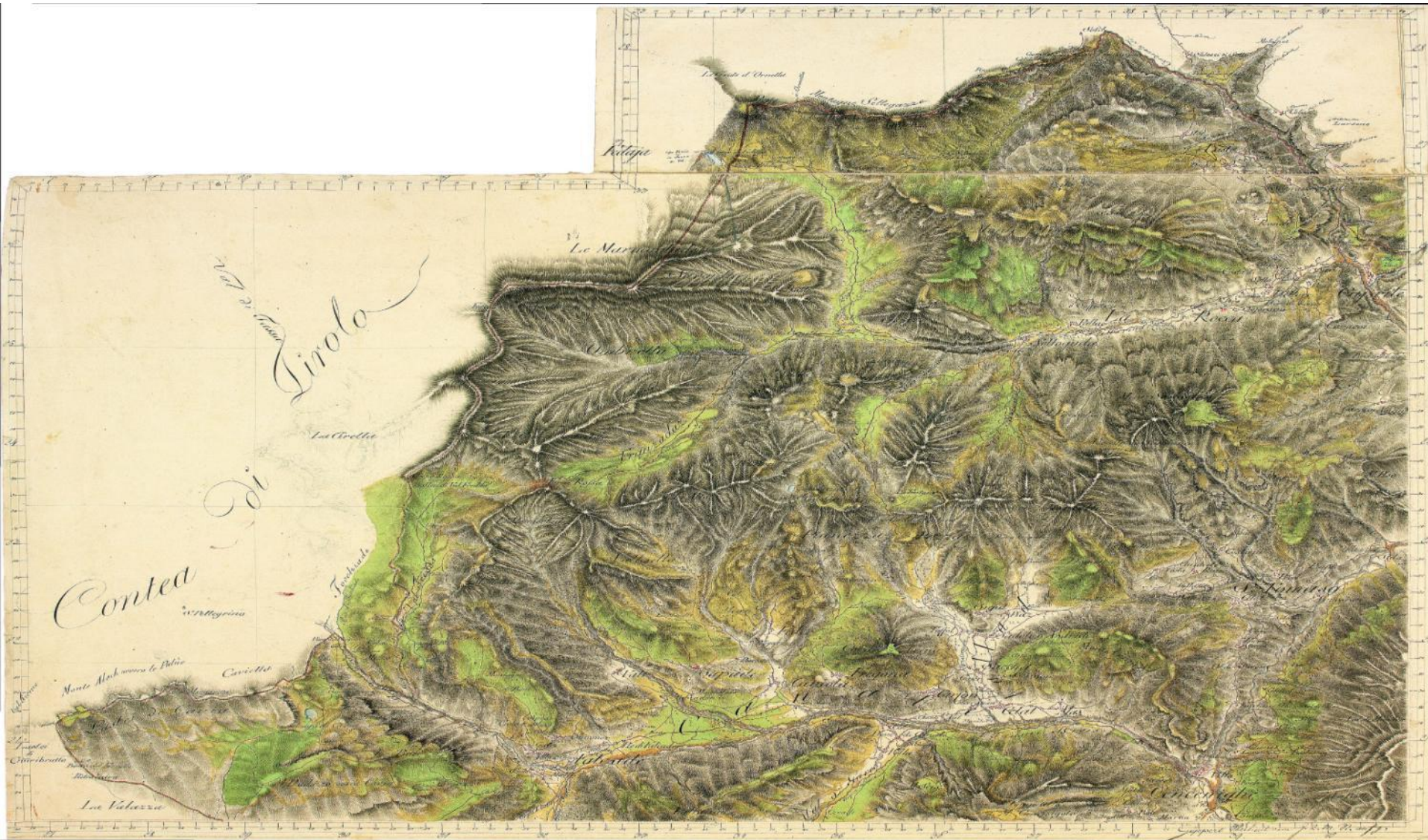
“Corners georeferencing” (6 corners/2-sheets, 10 corners/4-sheets, 22 corners/10-sheets etc.) = ca. 71 “corners-GCP”

Map-sheets shifting = 1 (2) GCP/1 map-sheet = 43 (86) GCP

Total = ca. 114 (157) CP



CP Kriegskarte	Lat.	Long. (Ferro)	Long. (Greenwich)
A	45° 27' 46"	28° 16' 48"	10° 37' 01,98"
B	45° 40' 51,8"	28° 44' 33"	11° 04' 46,98"
C	45° 34' 20"	28° 44' 32"	11° 04' 45,98"
D	45° 40' 46,8"	28° 58' 34"	11° 18' 47,98"
E	45° 47' 20"	28° 58' 31,1"	11° 18' 44,99"
F	45° 47' 15"	28° 44' 34"	11° 04' 47,98"
G	45° 53' 43"	28° 44' 29"	11° 04' 42,98"
H	45° 47' 23,4"	29° 12' 34"	11° 32' 47,98"
I	45° 53' 52"	28° 58' 25"	11° 18' 38,98"
L	45° 53' 57"	29° 12' 32,5"	11° 32' 46,3"
M	45° 53' 58,2"	29° 26' 38"	11° 46' 51,98"
N	46° 00' 31"	29° 26' 37,1"	11° 46' 50,98"
O	46° 00' 30"	29° 12' 30,2"	11° 32' 43,98"
P	46° 00' 31"	29° 40' 43"	12° 00' 56,98"
Q	46° 07' 03"	29° 12' 27"	11° 32' 40,98"
R	46° 07' 04"	29° 26' 34"	11° 46' 47,98"
S	46° 20' 11,1"	29° 40' 46"	12° 00' 59,98"
T	46° 20' 11"	29° 26' 35"	11° 46' 48,98"
U	46° 26' 44"	29° 40' 48"	12° 01' 01,98"
V	46° 26' 43"	29° 26' 36"	11° 46' 49,98"

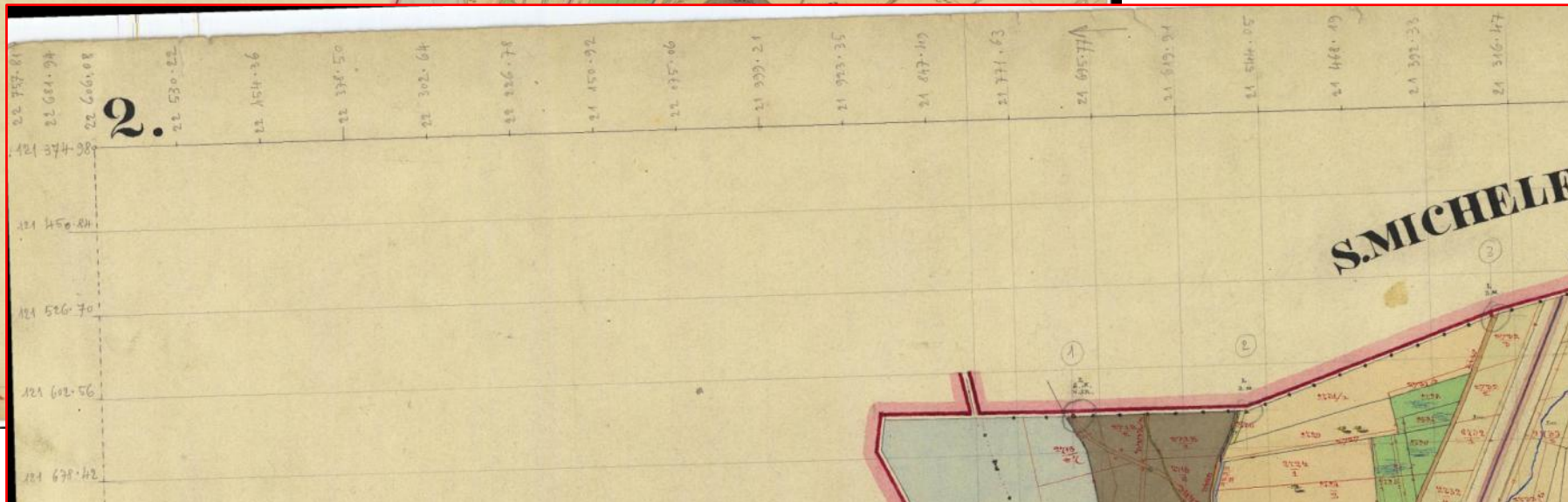
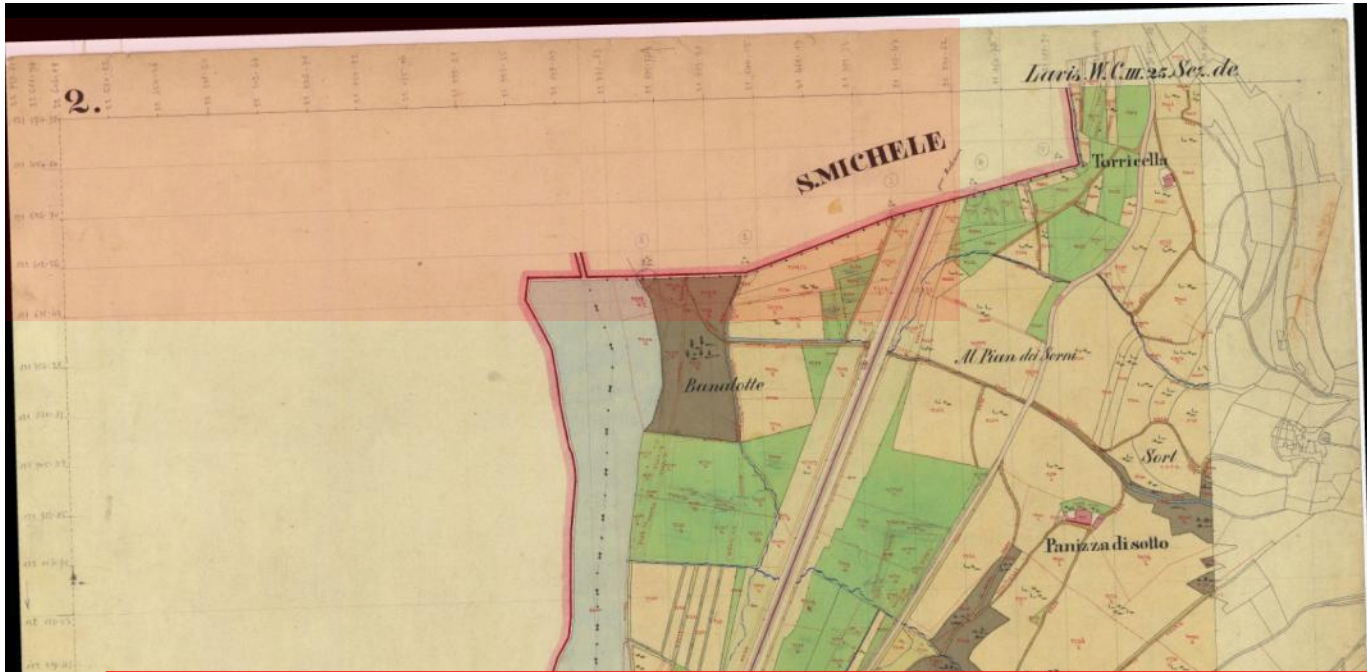


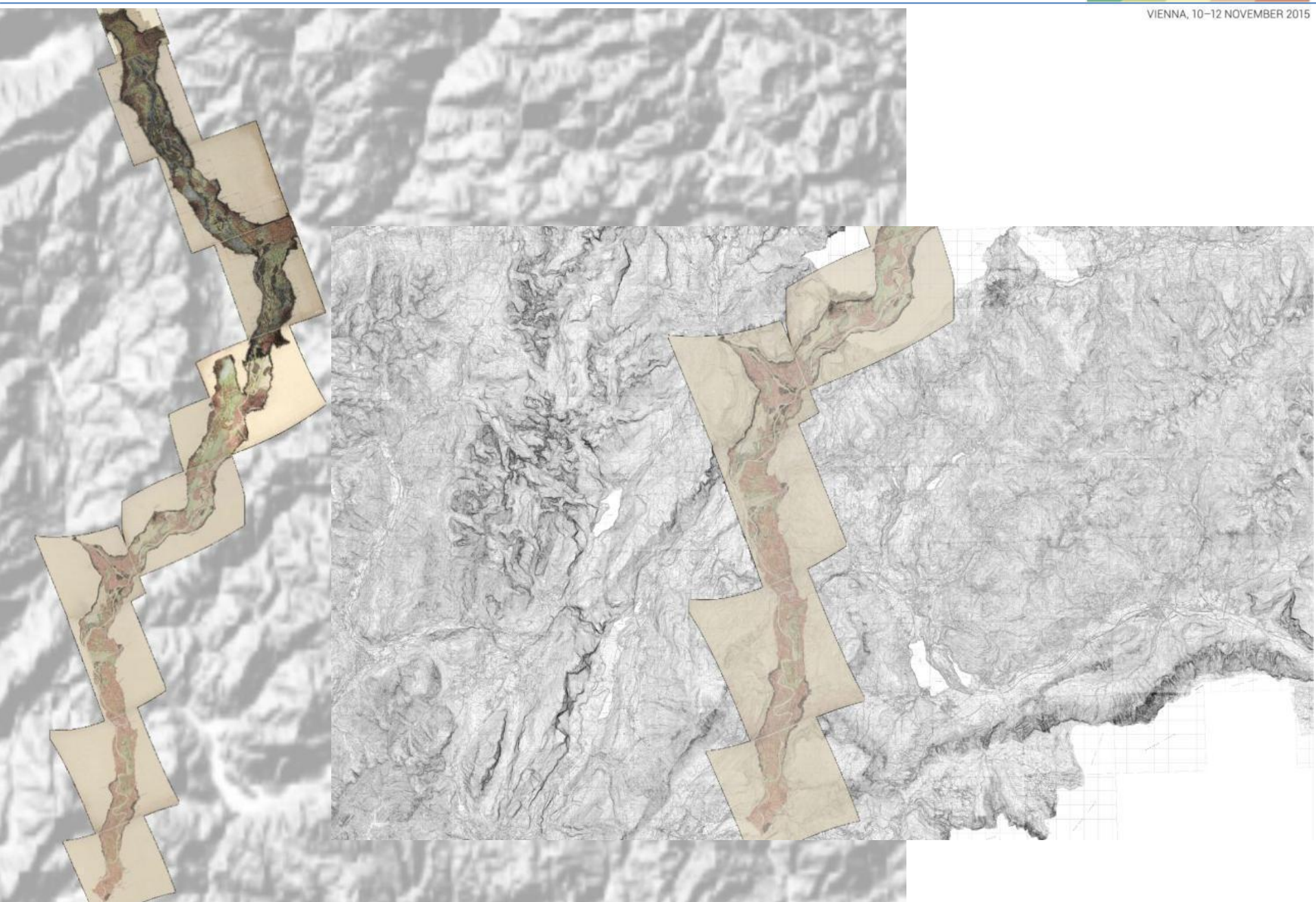
XI.6 – XI.7 Ferro

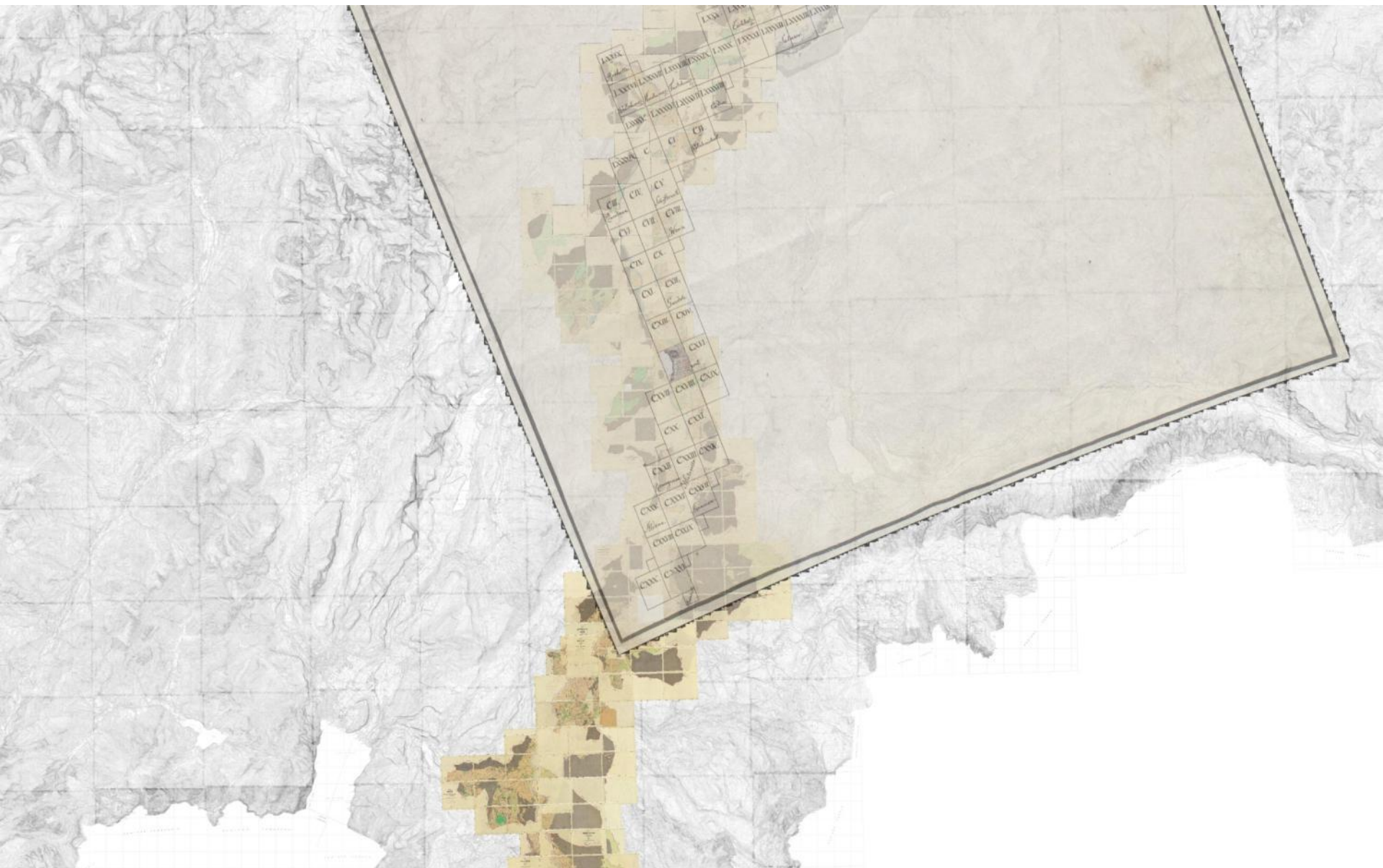


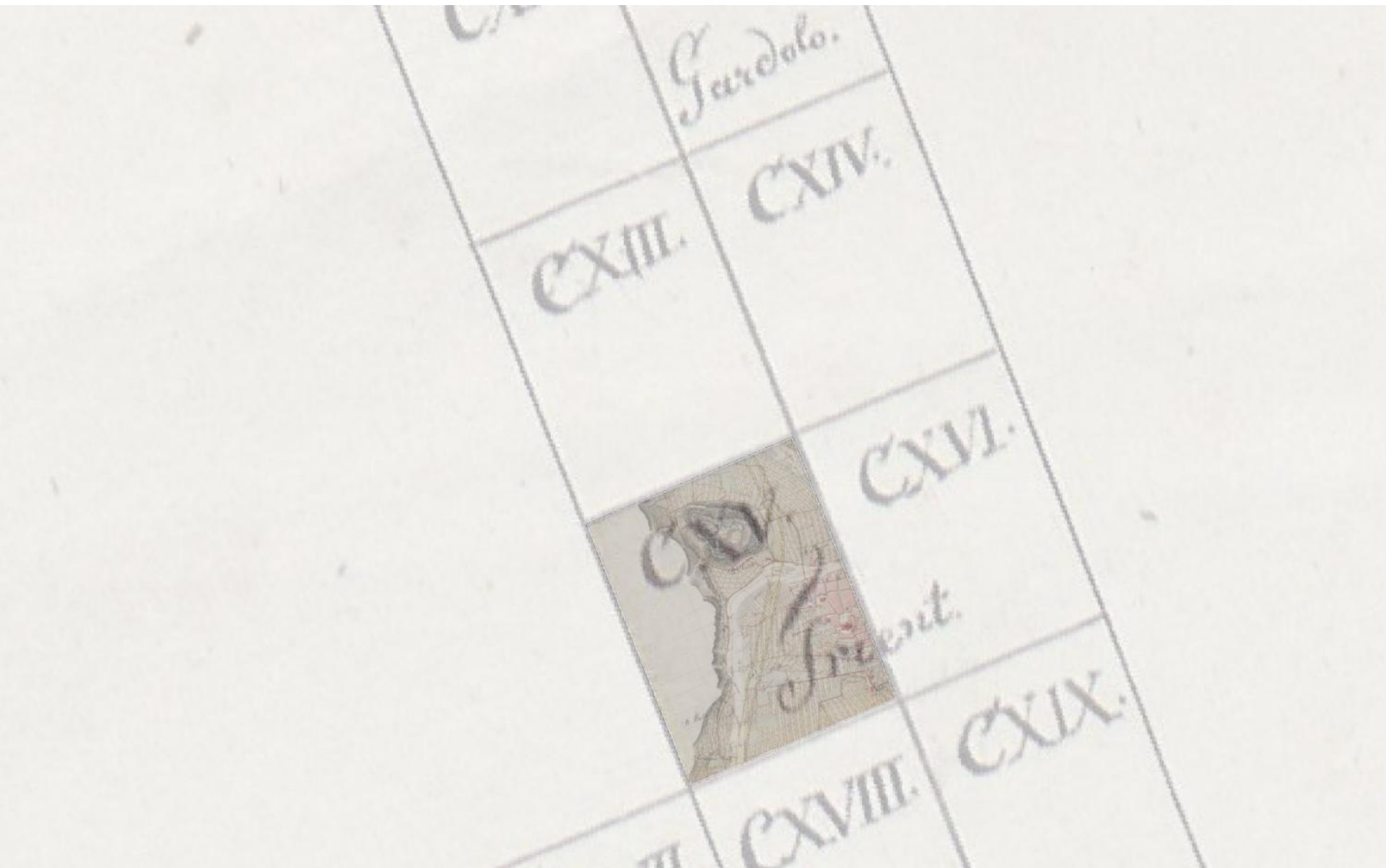


Catasto-Ferro_1810 → ETRF89 UTM

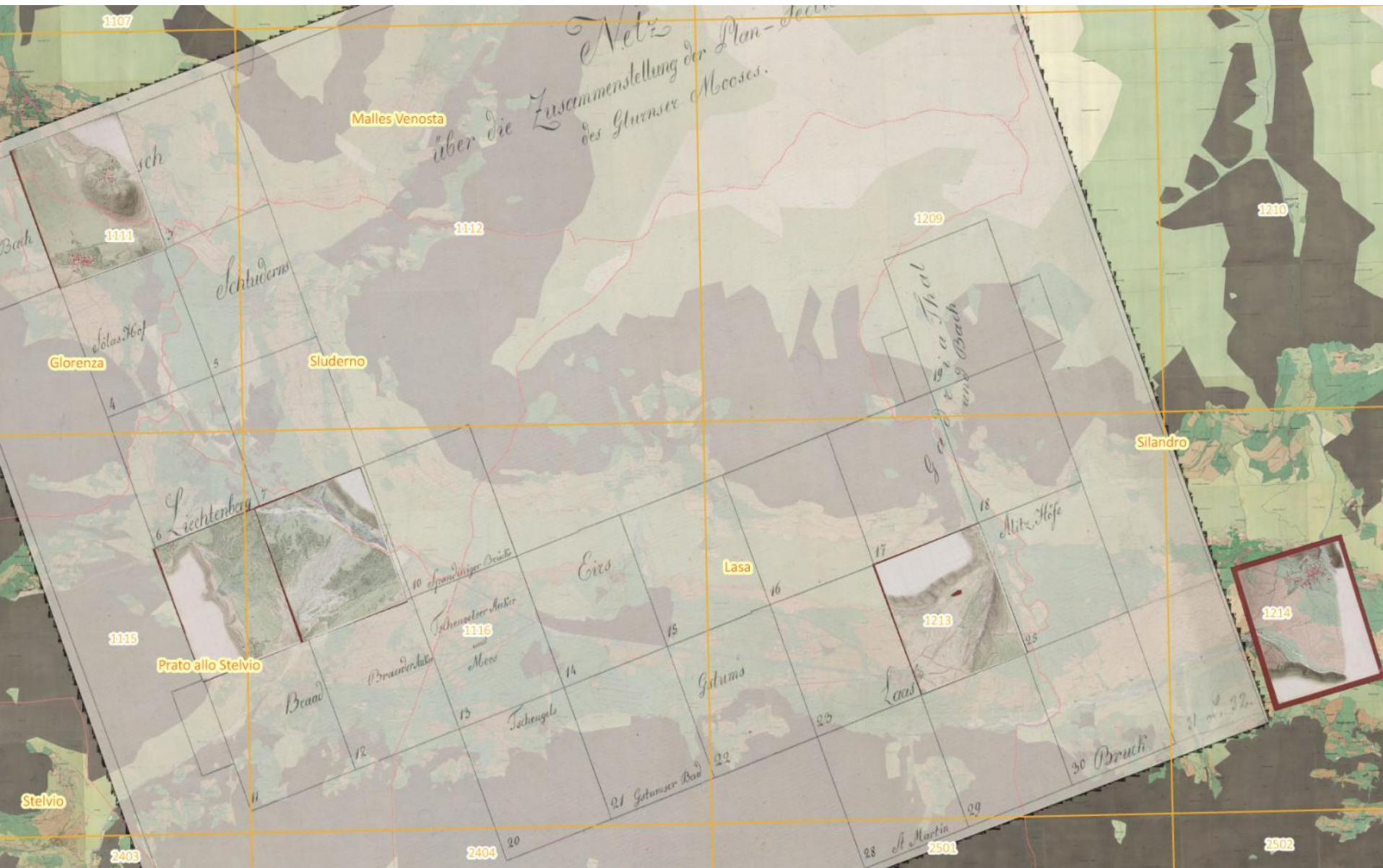


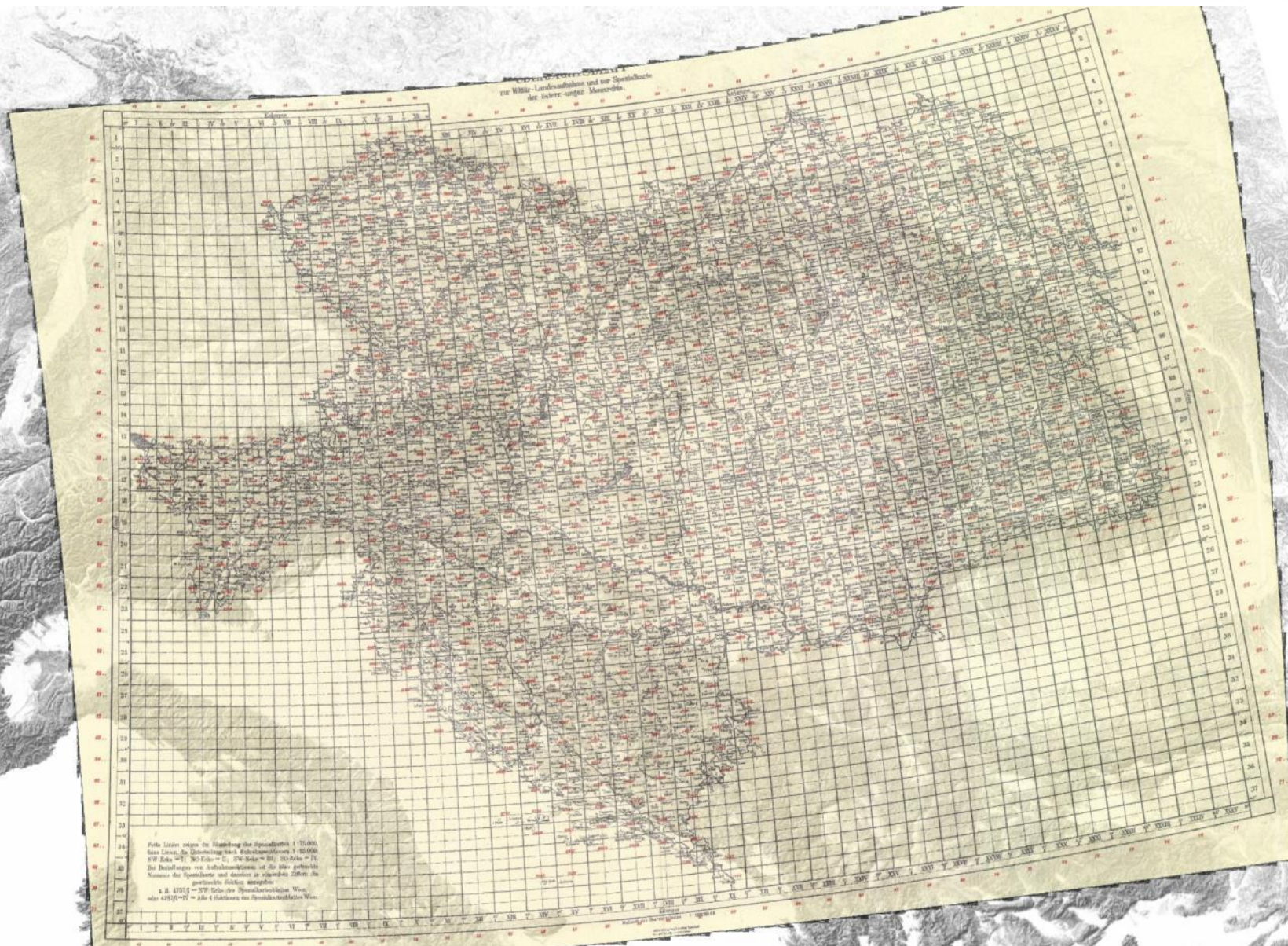


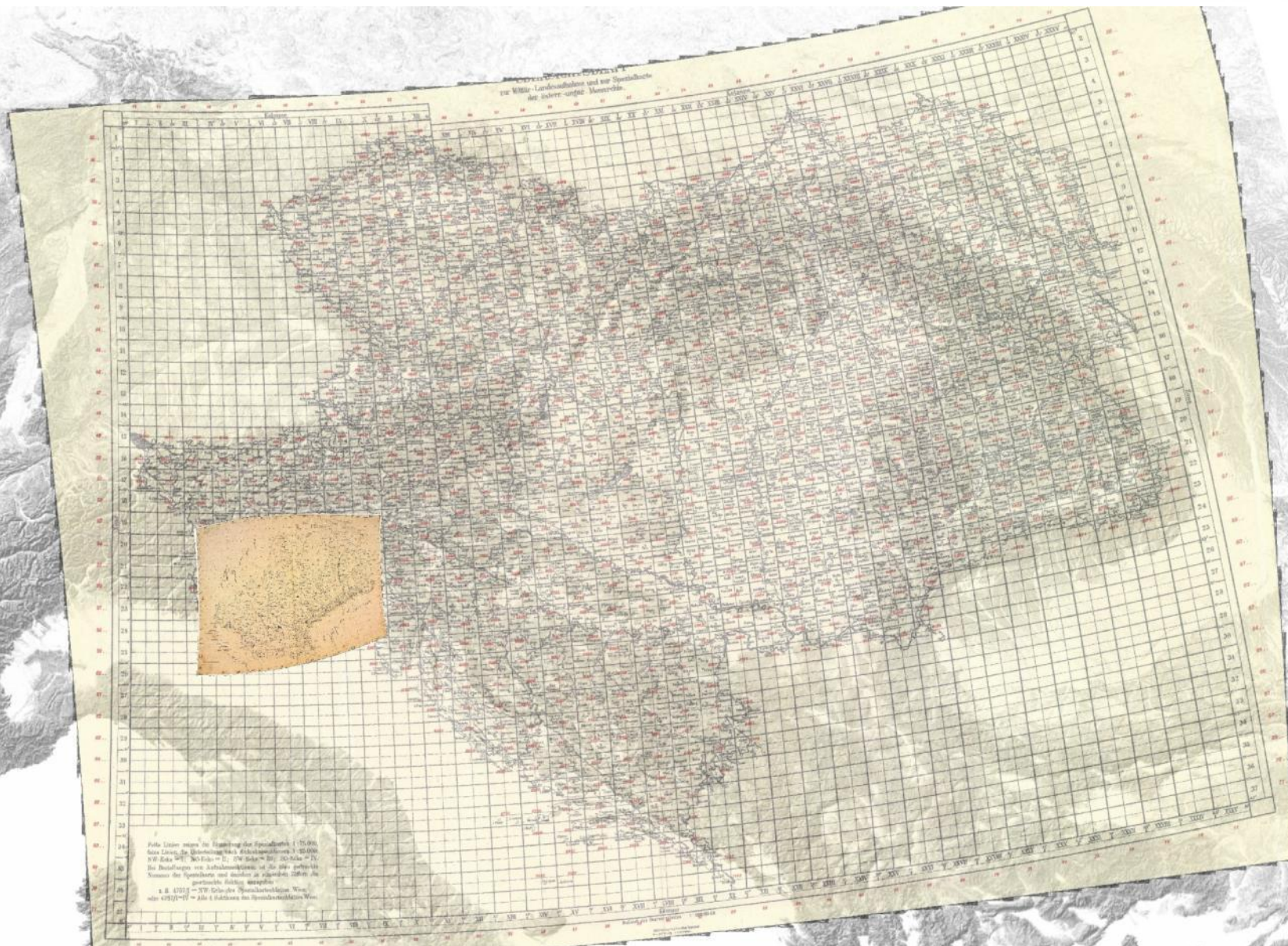


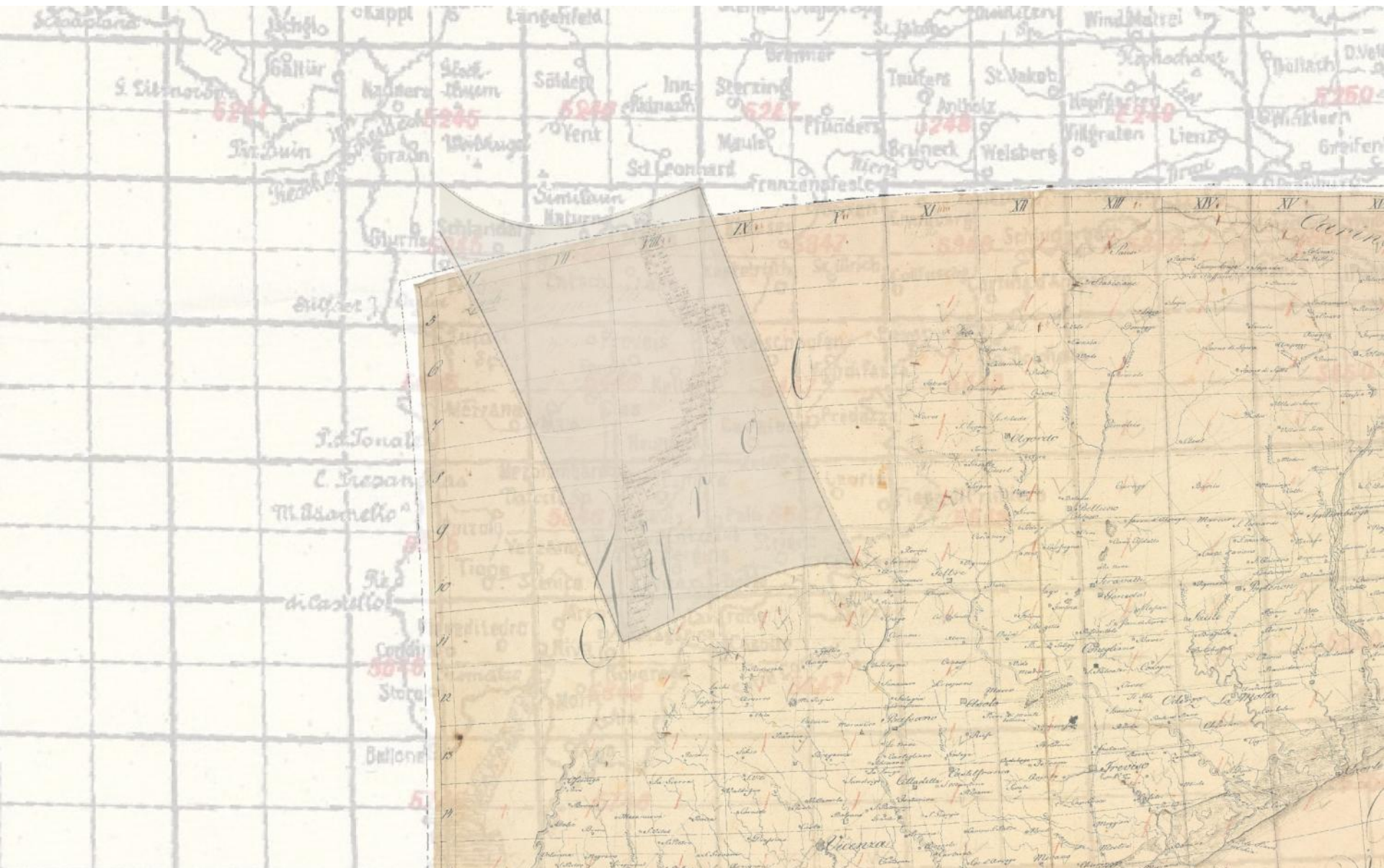


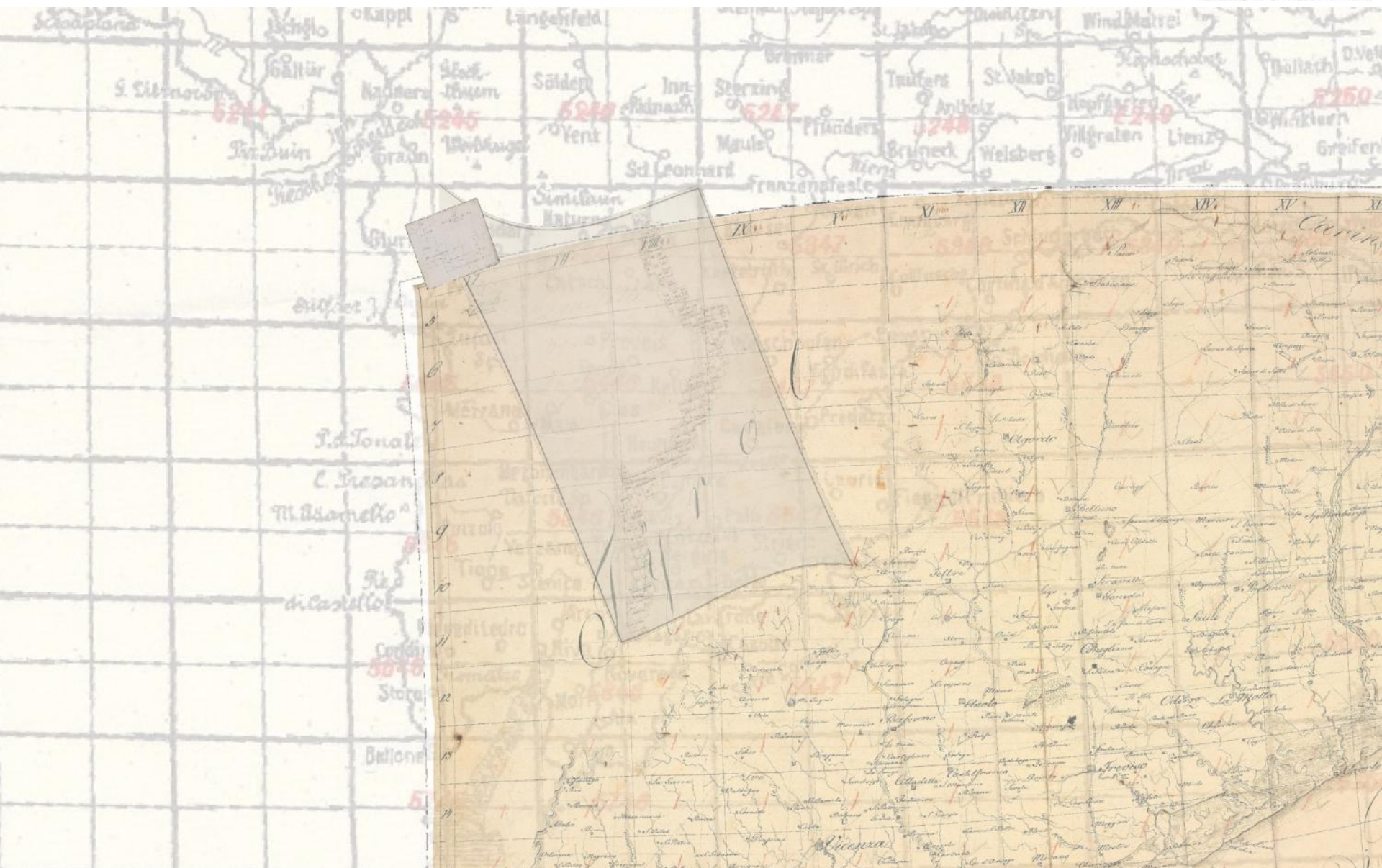


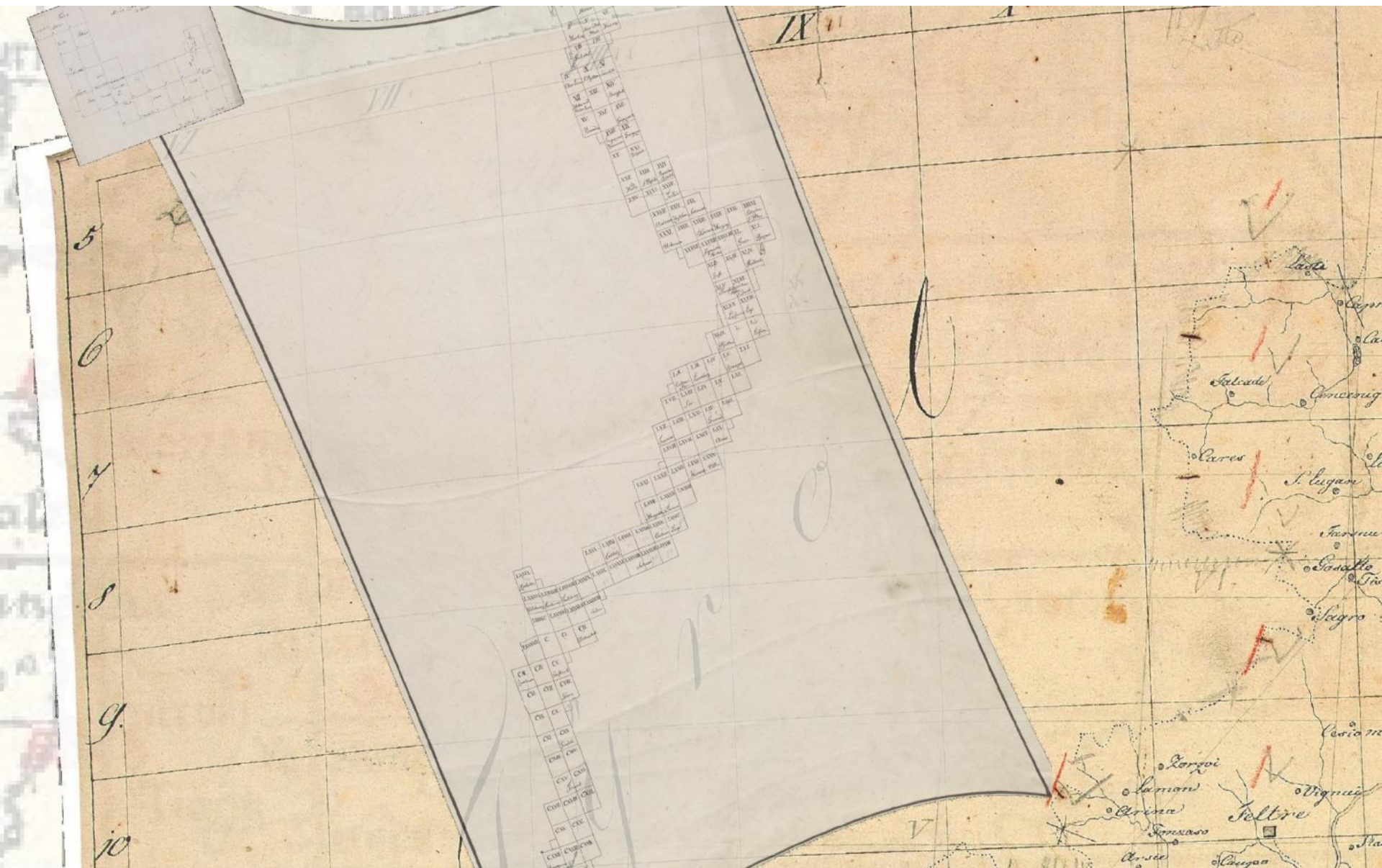


























Thank you very much for your attention!

