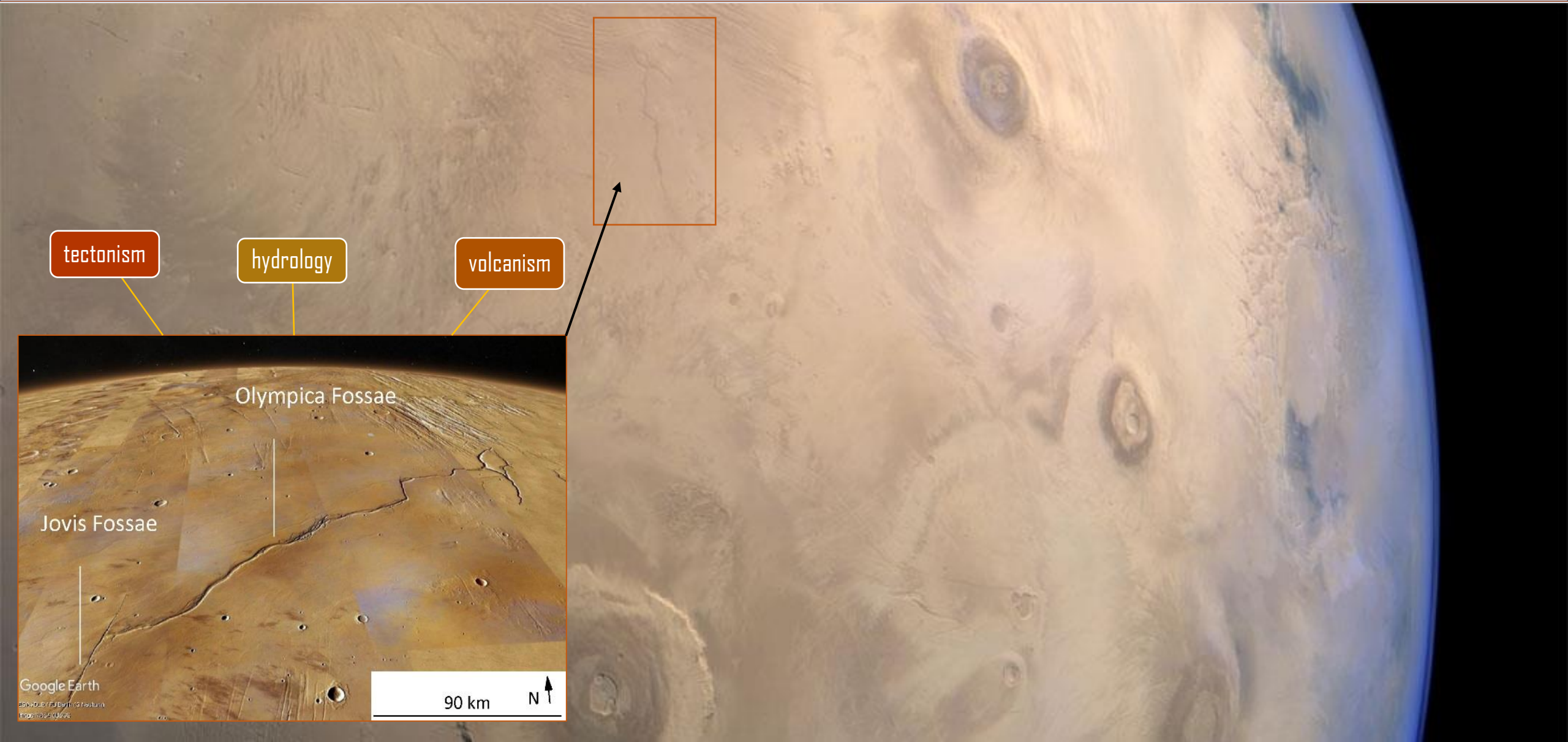


OLYMPICA – JOVIS FOSSAE

LARGE-SCALE GROUNDWATER FLOW IN RESPONSE TO MAGMATIC EVENTS

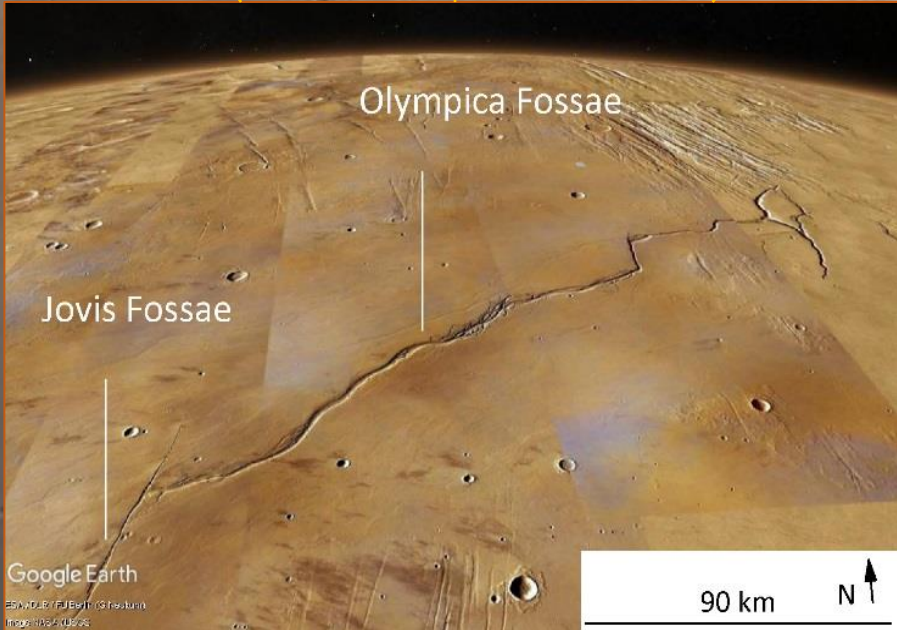
M.Sc., Eng., Anita Zambrowska



tectonism

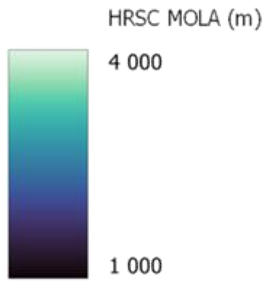
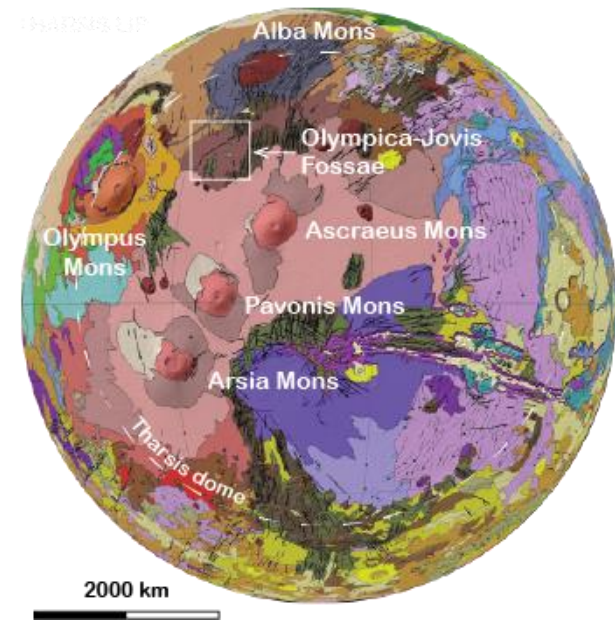
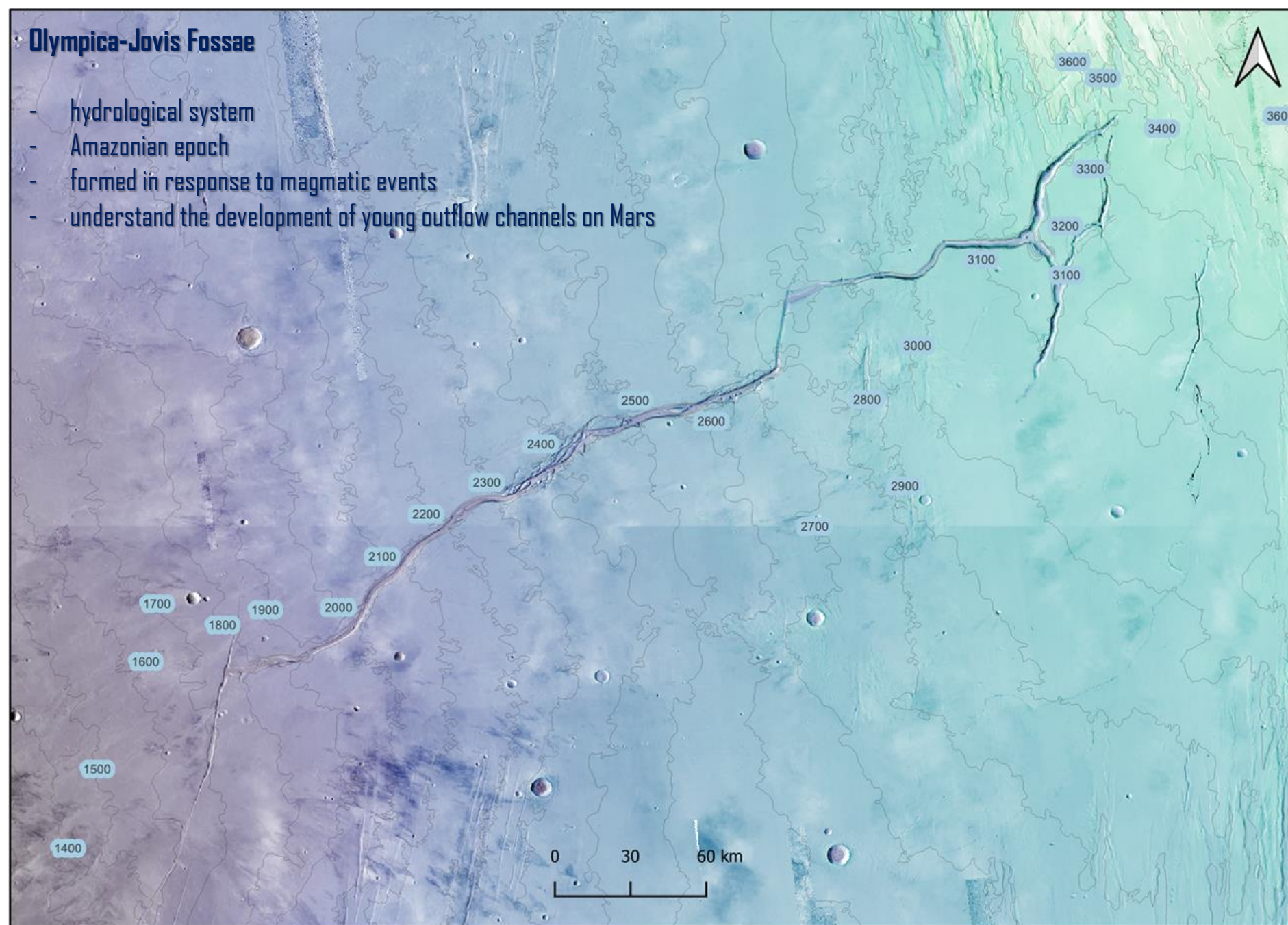
hydrology

volcanism



Olympica-Jovis Fossae

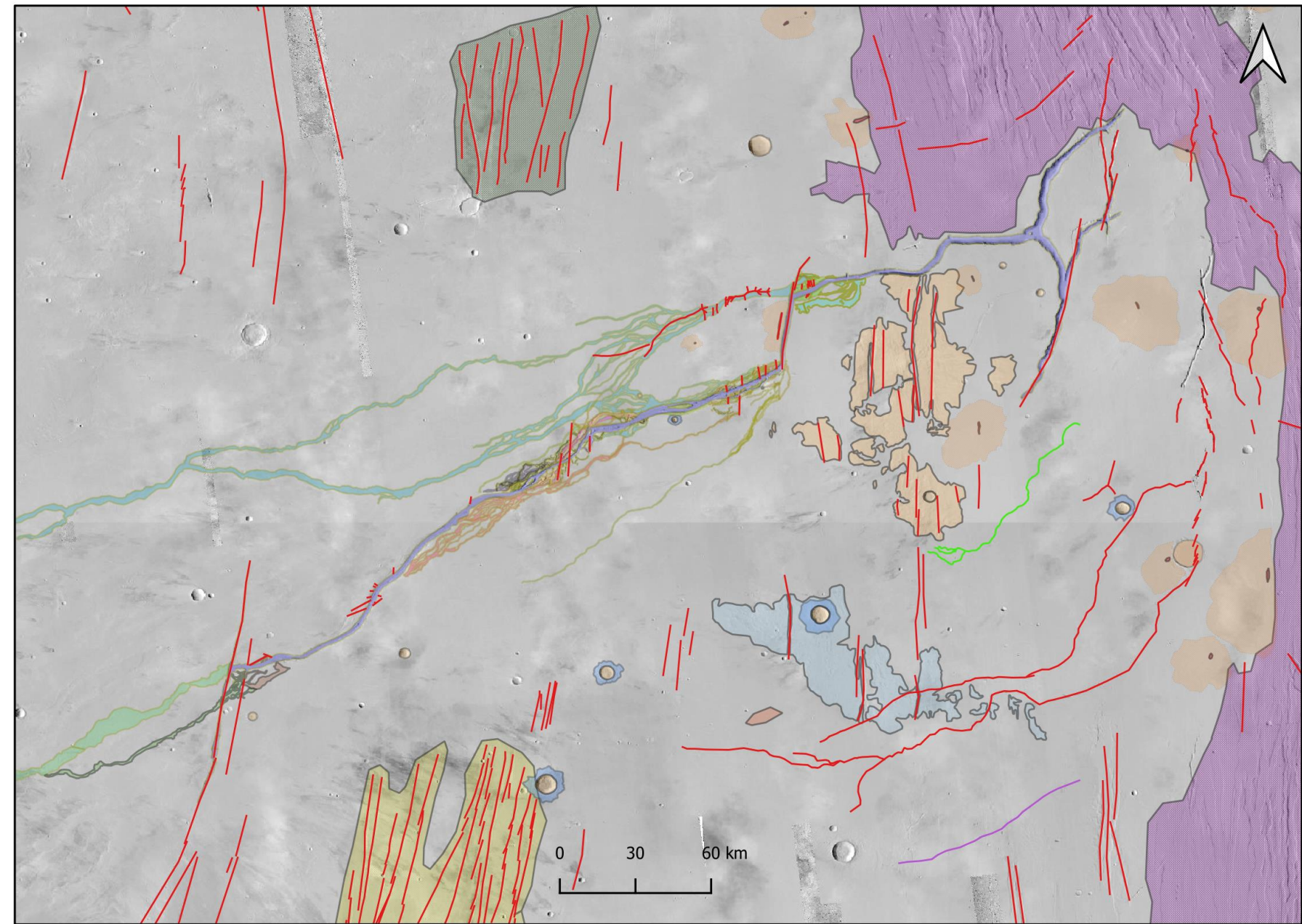
- hydrological system
- Amazonian epoch
- formed in response to magmatic events
- understand the development of young outflow channels on Mars



Data used in the Geologic Mapping


Spacecraft /Instrument	Data type	Number	Resolution
ExoMars TGO/CaSSIS stereo camera	Vis to NIR single images, 3 or 4 filters	83 images	4.5 m
	Digital terrain model	9 image pairs	9 m
MRO/CTX camera	Panchromatic	100% coverage	5 m
MRO/HiRISE camera	Panchromatic	50	0.25-1 m
MO/THEMIS (multispectral)	TIR, 8 bands	100% coverage	100 m
	Quantitative thermal inertia map	100% coverage	100 m, 32 bit
MO/THEMIS (panchromatic)	Panchromatic	100% coverage	19 m
MO/THEMIS (night-time imagery)	Thermal inertia map	100% coverage	100 m
MGS/MOC-NA CCD camera	Panchromatic	140	1 to 12 m
MGS/MOLA laser altimeter	Tracks	100% coverage	V=1m; H=variable
	Digital terrain model	100% coverage	128 pixels/degree
MRO/CRISM spectral imager (FRT/HRL)	NIR, 1.00-3.94 μm , 438 channels	12	18 m
MRO/SHARAD sounding radar	Radar tracks	75	20 MHz
ExoMars TGO/FREND neutron counter	Water-equivalent abundance at 0-1 m	100% coverage	$1^\circ \times 1^\circ$ or better
MGS/MOLA - MEX HRSC	DEM	100% coverage	200 m

Geomorphologic and geologic mapping





— fracture lines

Channels


 1 -42


Craters

 crater


 ejecta


Volcanoes


 fissure


 lava flow


Deposits

 Noachian

 Noachian

 Noachian/Early Hesperian

 Noachian/Early Hesperian

 Hesperian

 (?)

CTX - global mosaic

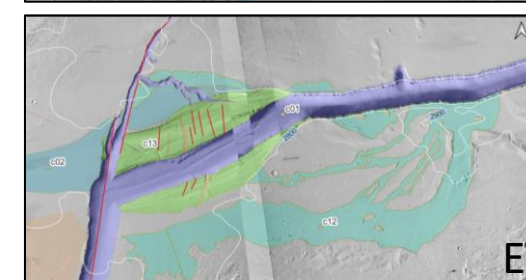
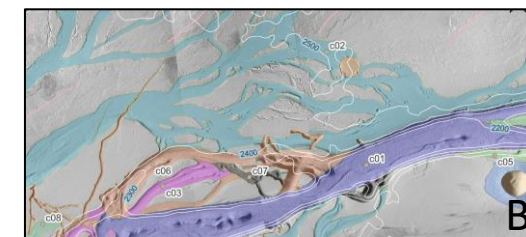
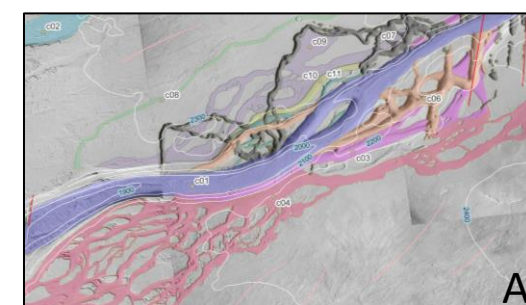
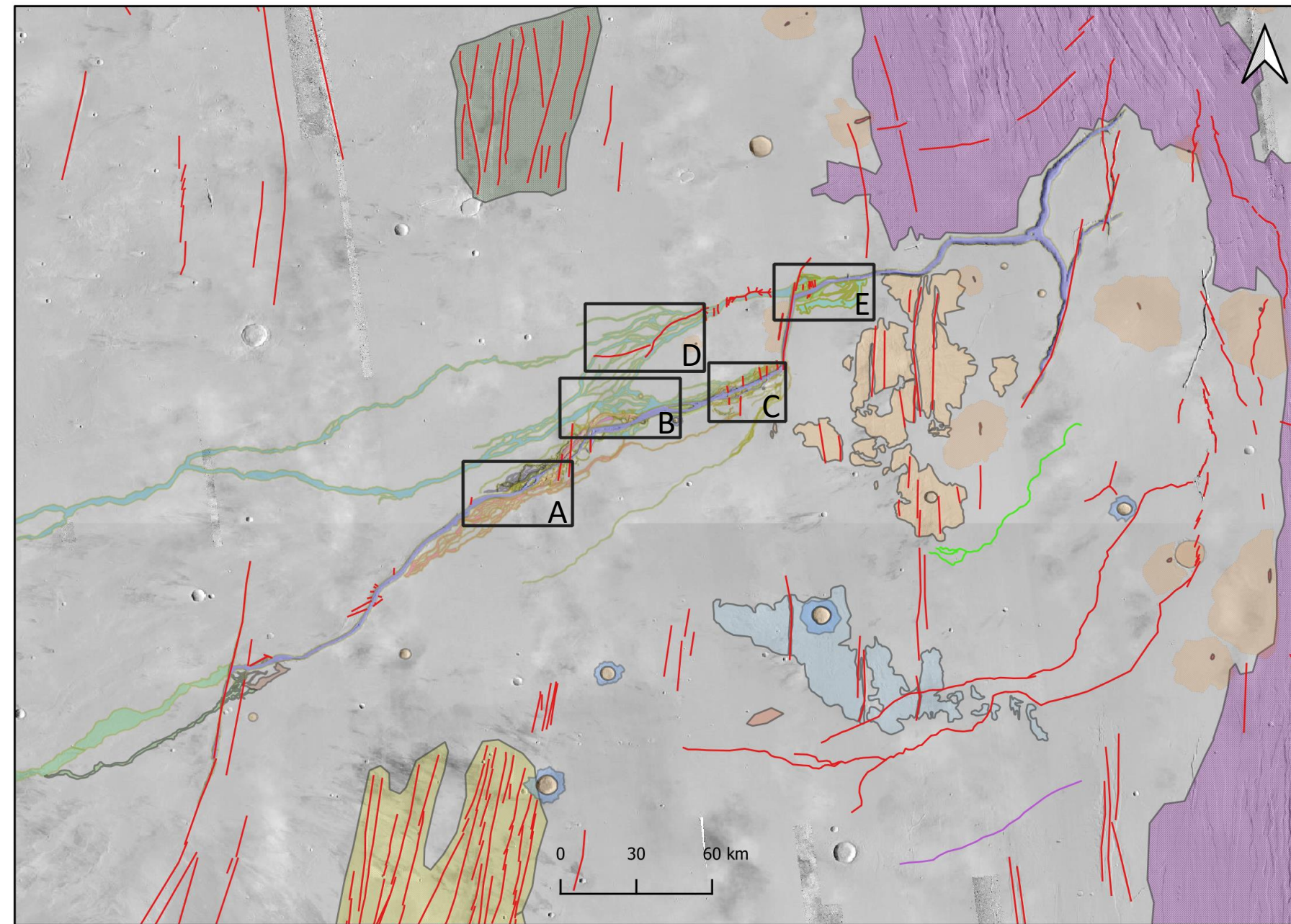
INTRODUCTION

DATA & METHODS

RESULTS

ANALYSIS

Selected areas to detailed analysis



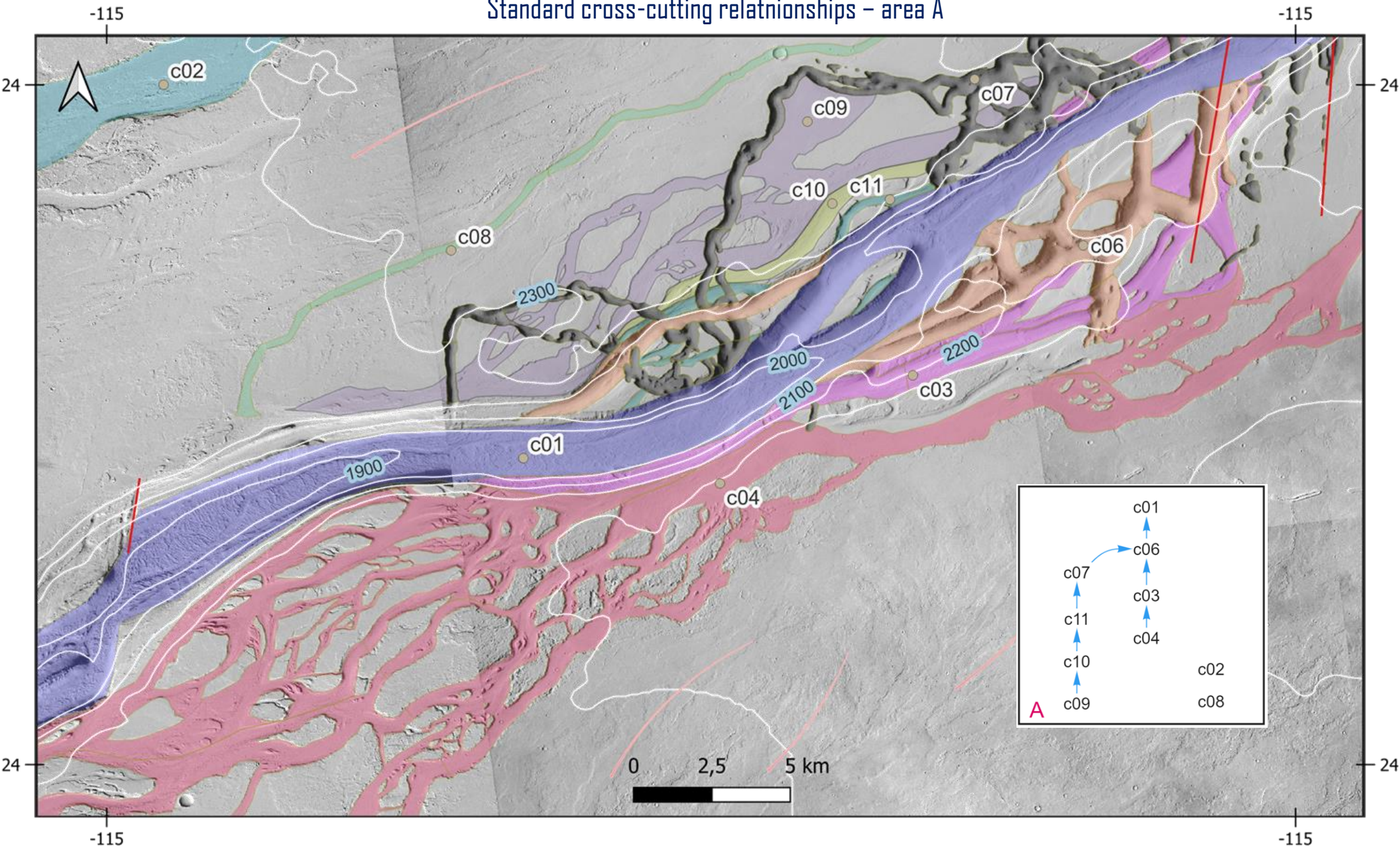
INTRODUCTION

DATA & METHODS

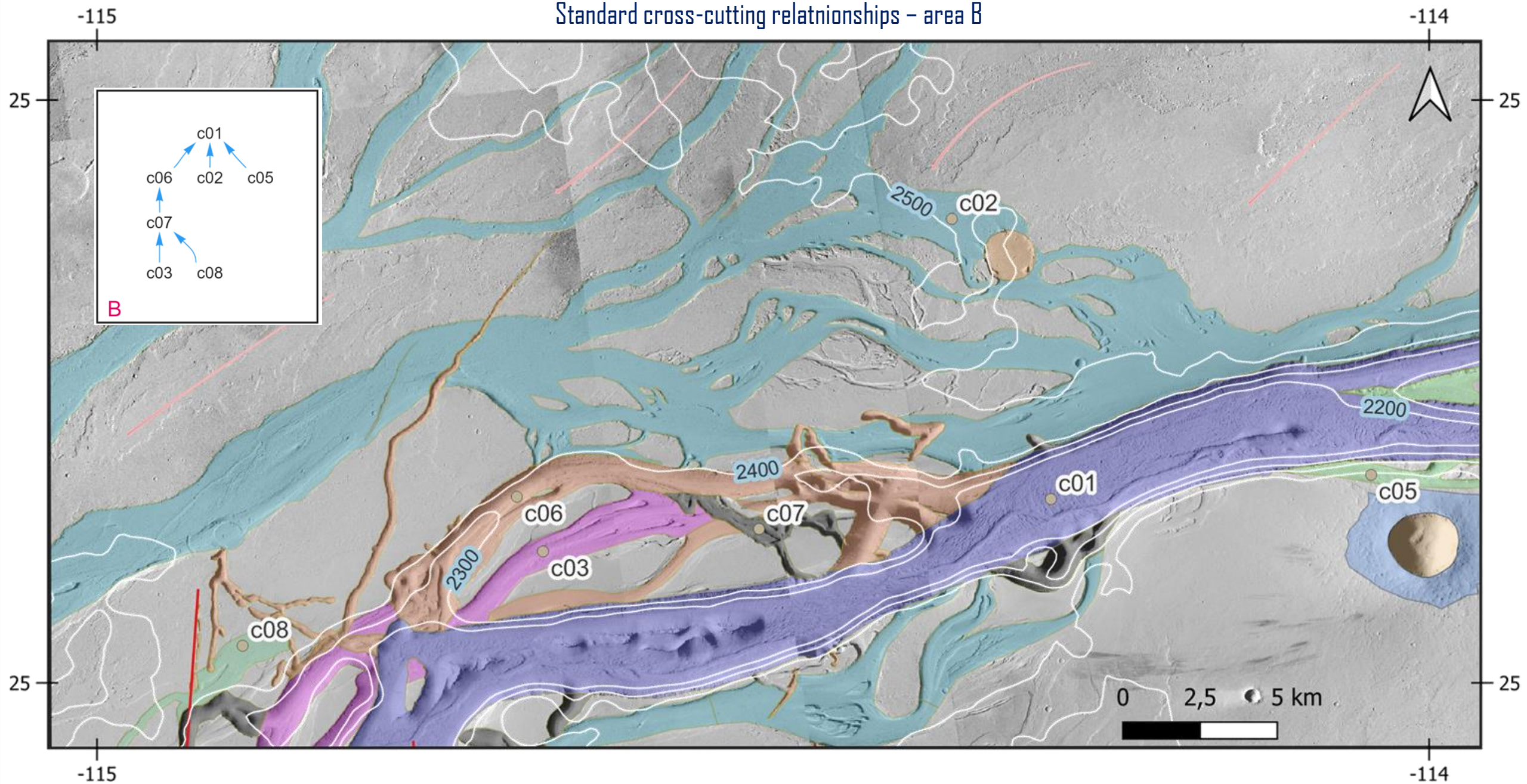
RESULTS

ANALYSIS

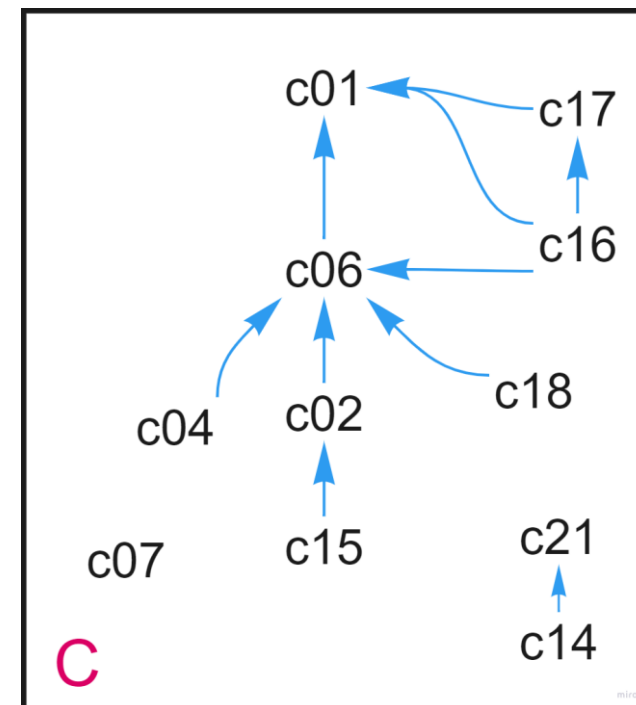
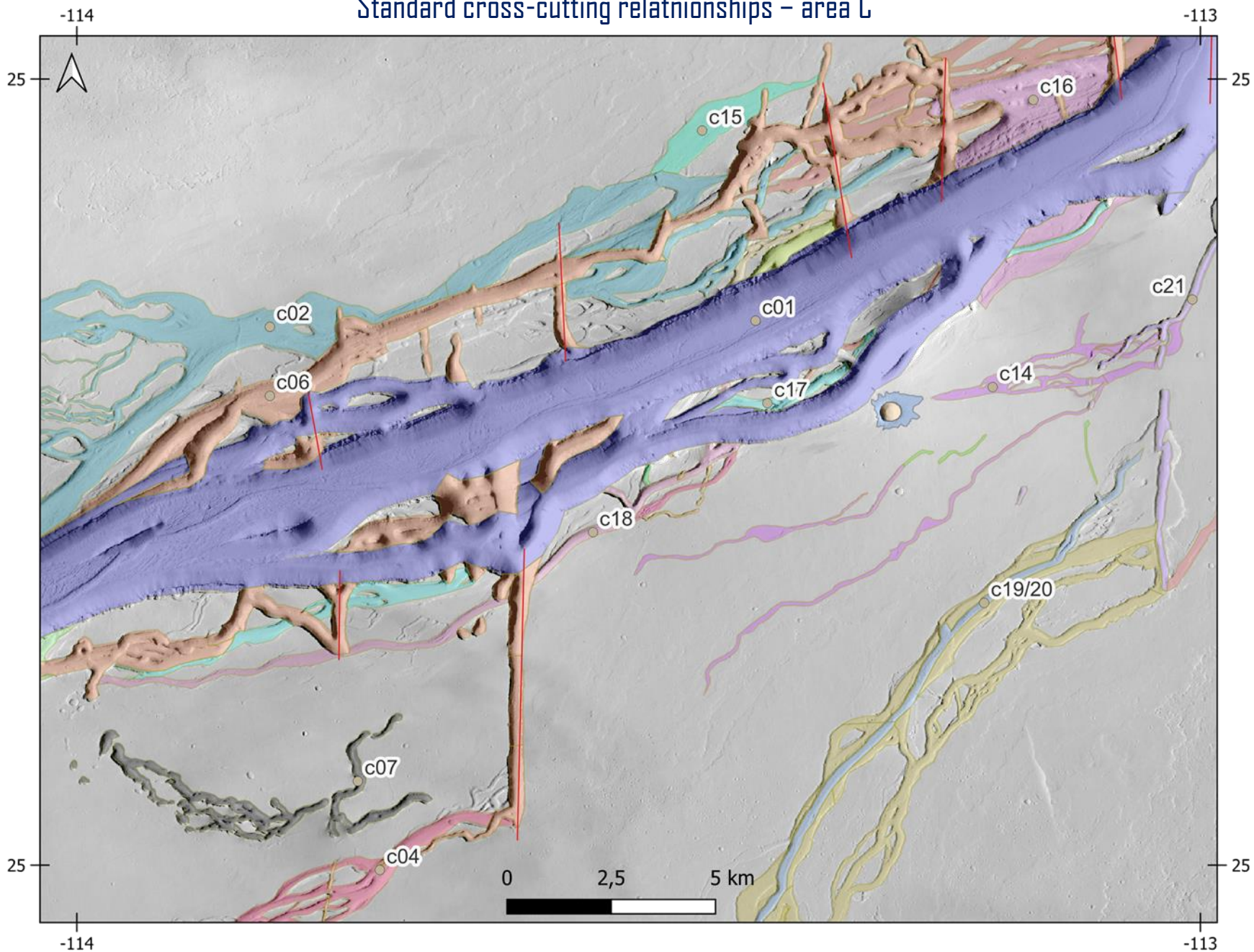
Standard cross-cutting relationships - area A



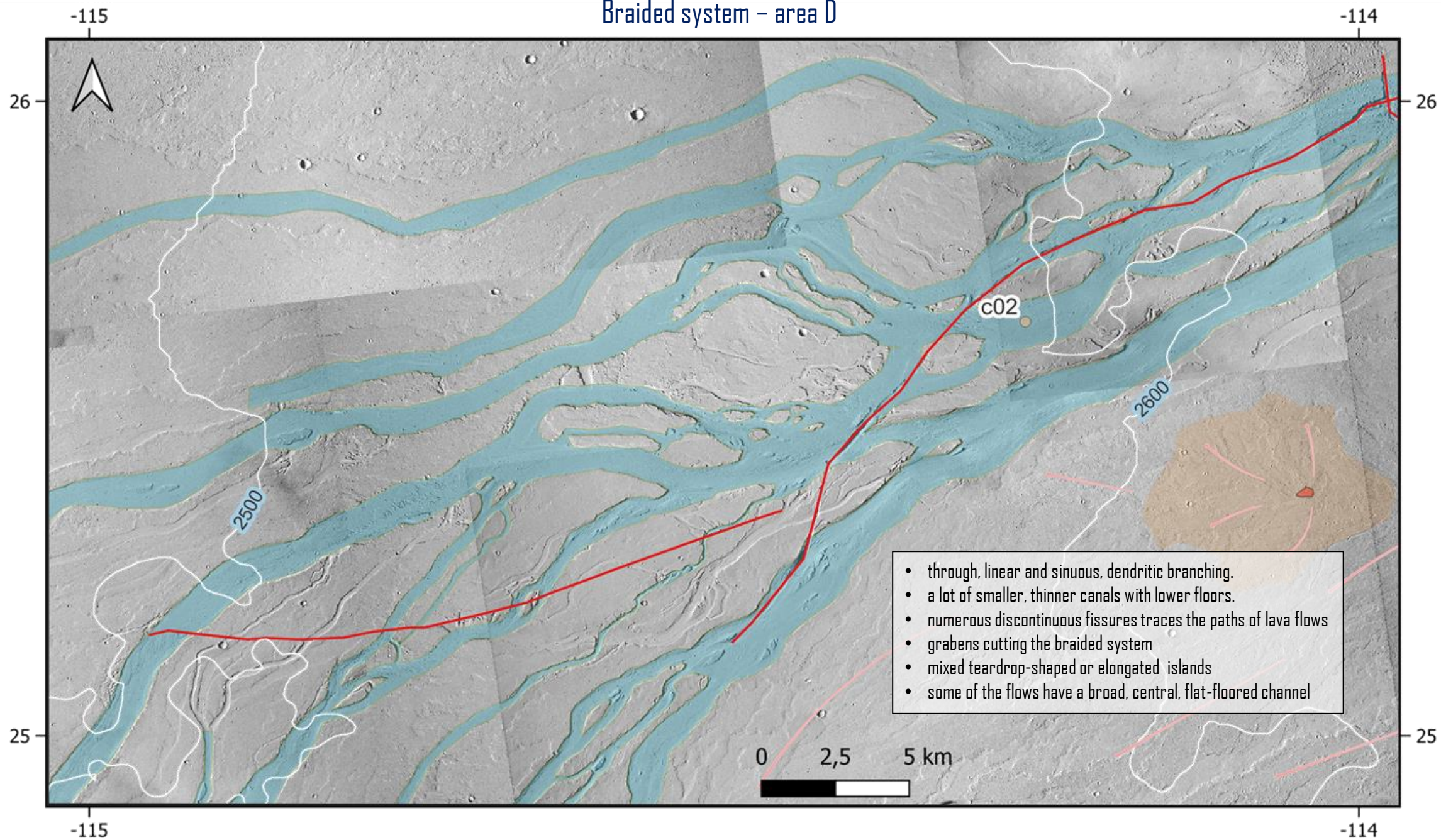
Standard cross-cutting relationships - area B



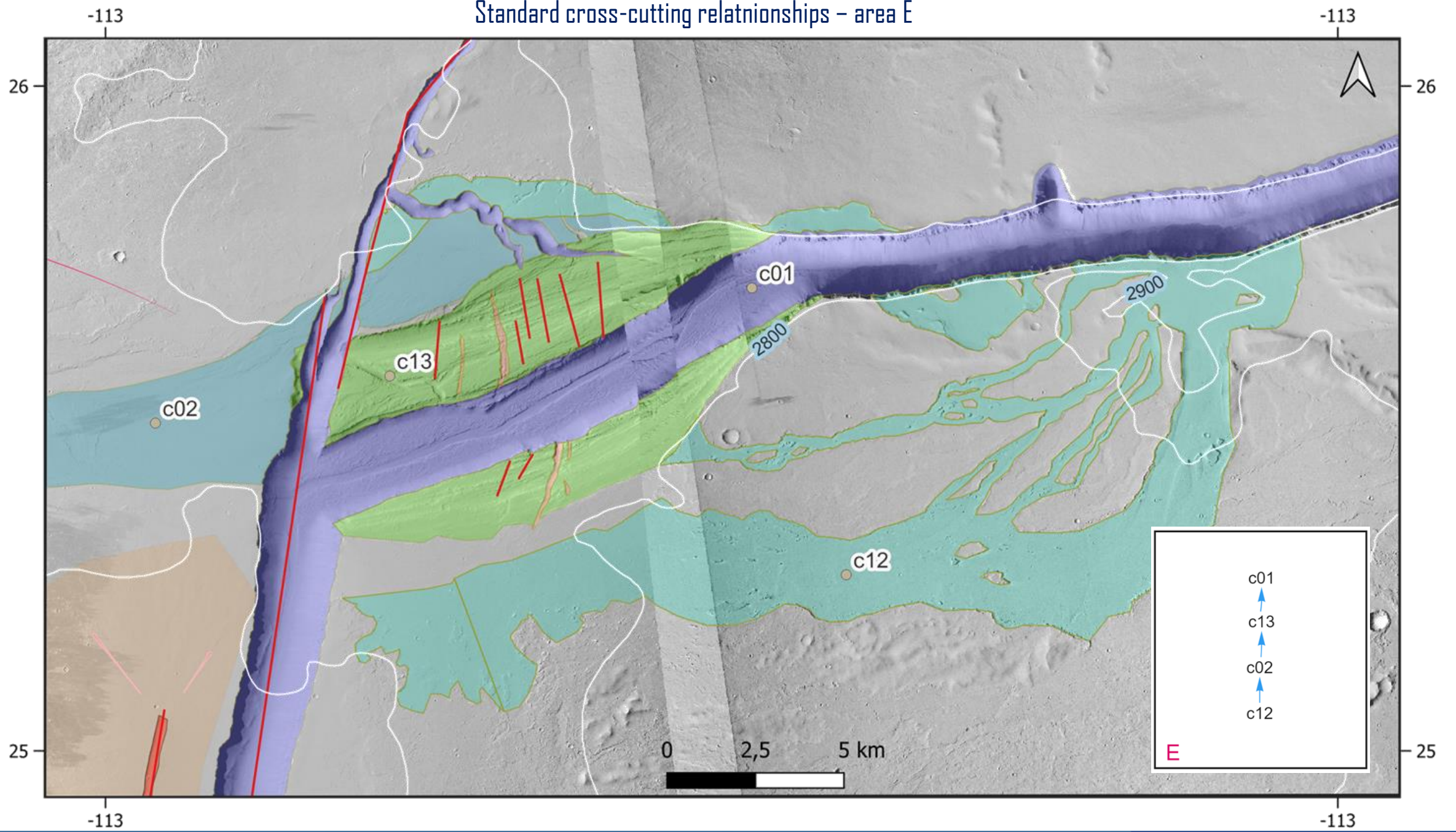
Standard cross-cutting relationships - area C



Braided system - area D



Standard cross-cutting relationships - area E



Bibliography:

- Fastook, J.L., Head, J.W., Marchant, D.R., Forget, F., 2008, Tropical mountain glaciers on Mars: Altitude-dependence of ice accumulation, accumulation conditions, formation times, glacier dynamics, and implications for planetary spin-axis/orbital history, *Icarus* 198, 305-317
- Harrison, K.P., 2009, An Alternative View of Martian Chaotic Terrain Formation, LPSC
- Hamilton, C.W., Mouginis-Mark, P.J., Sori, M.M., Scheidt, S.P., Bramson, A.M., 2018, Episodes of Aqueous Flooding and Effusive Volcanism Associated With Hrad Vallis, Mars, AGU
- Nussbaumer, J., 2008, The Granicus and Tinjar Valles Channel System, LPSC
- Plescia, J.B., 2013, Olympica Fossae Valles - Newly recognized fluvial-volcanic system, LPSC
- Skinner, J.A., Skinner, L.A., Kargel, J.S., 2007, Re-Assessment of Hydrovolcanism-based Resurfacing Within the Galaxias Fossae Region of Mars
- Sutton, S.S., Hamilton, C.W., Cataldo, V., Williams, D.A., Bleacher, J.E., 2022, Sinuous channels east of Olympus Mons, Mars Implications for volcanic, hydrological, and tectonic processes, *Icarus* 374(2022) 114798



OLYMPICA – JOVIS FOSSAE
LARGE-SCALE GROUNDWATER FLOW IN RESPONSE TO MAGMATIC EVENTS

