

Fondement et utilisation du PER-GH: implications sur l'évolution du volcanisme et de l'hydrothermalisme dans le Blake River.

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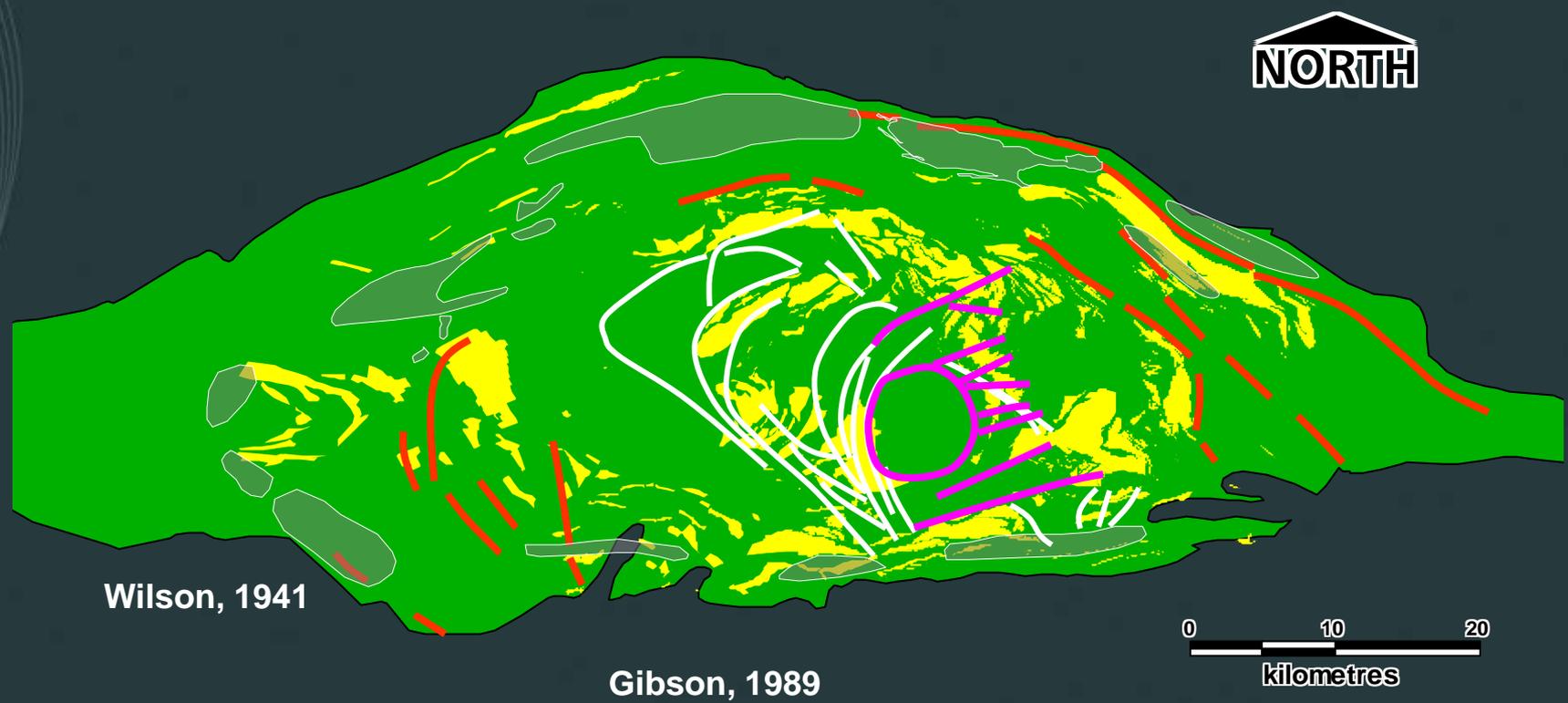
Et

Vital Pearson (CONSOREM)

*Conférence présentée initialement à l'ATELIER CONSOREM 2007:
Développements récents sur le Groupe de Blake River en Abitibi*



Modèle caldeiras multiples et séquentielles



Wilson, 1941

Gibson, 1989

0 10 20
kilometres

Modifiée de Pearson et Daigneault, 2009

1) Géochimie des rhyolites valide le modèle ?

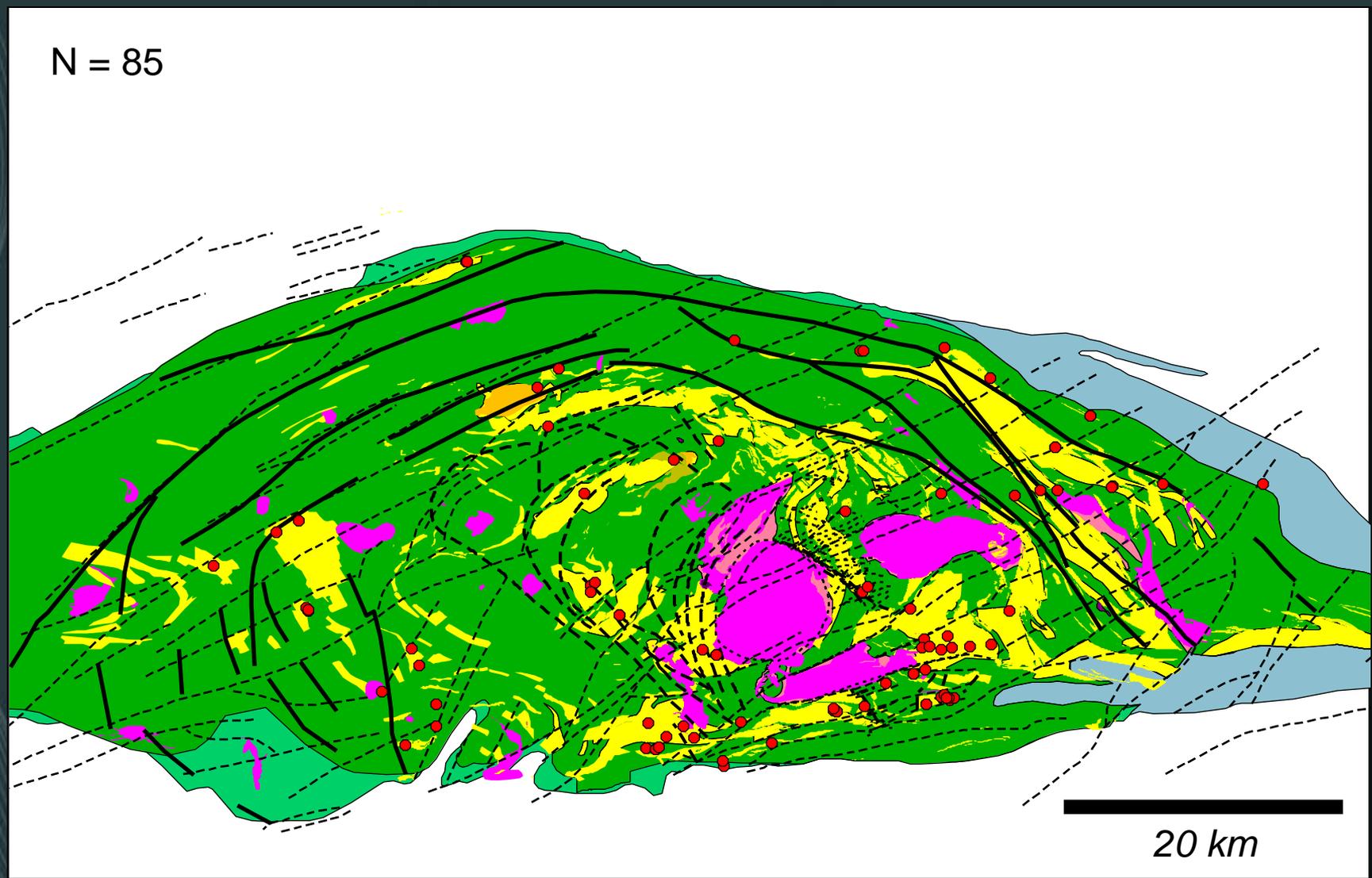
Eléments traces (CONSOREM)

Eléments majeurs (NOREX): PER-GH

2) Implication pour VMS ?

Rhyolite CONSOREM

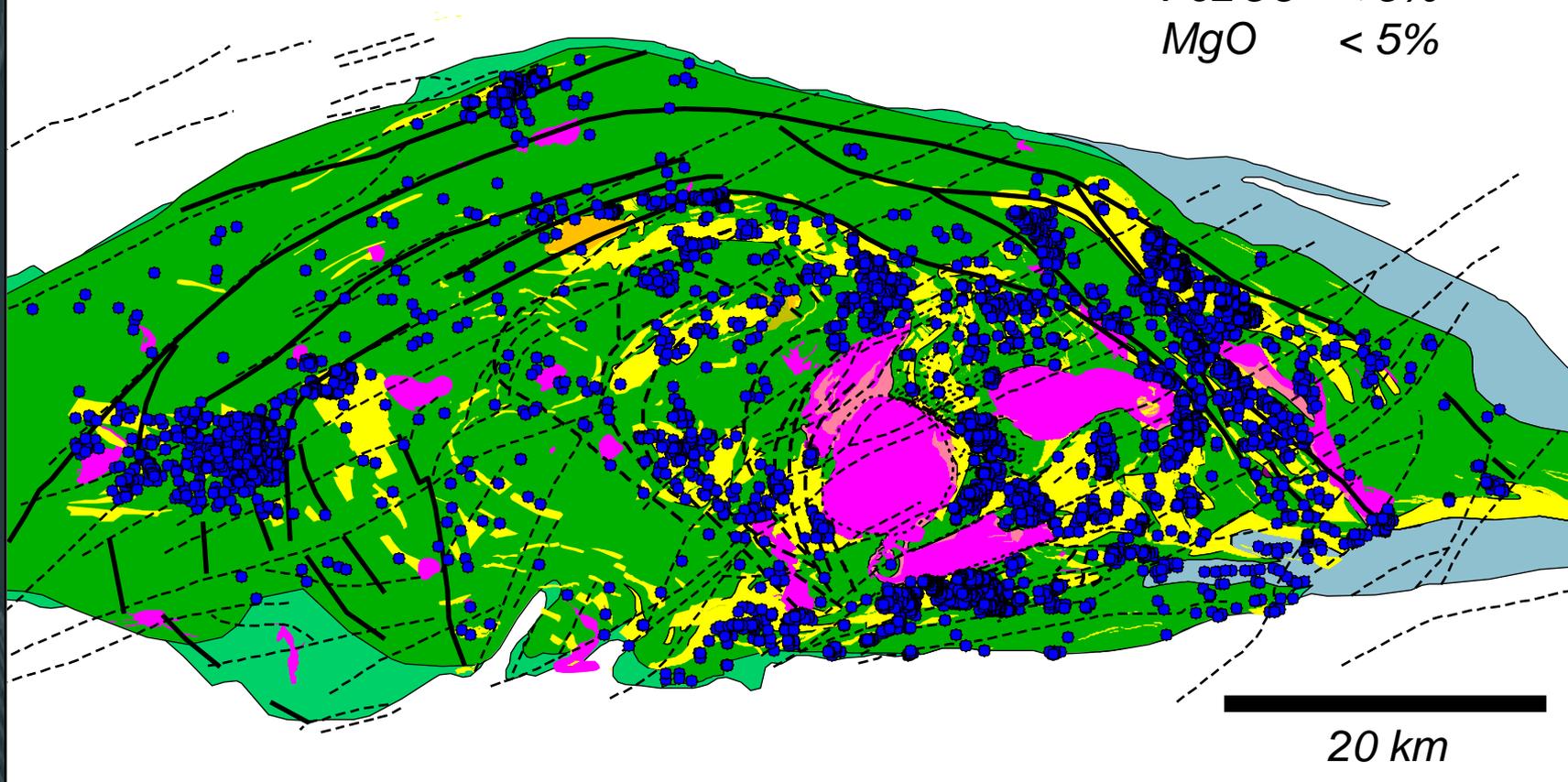
N = 85



Rhyolite NOREX

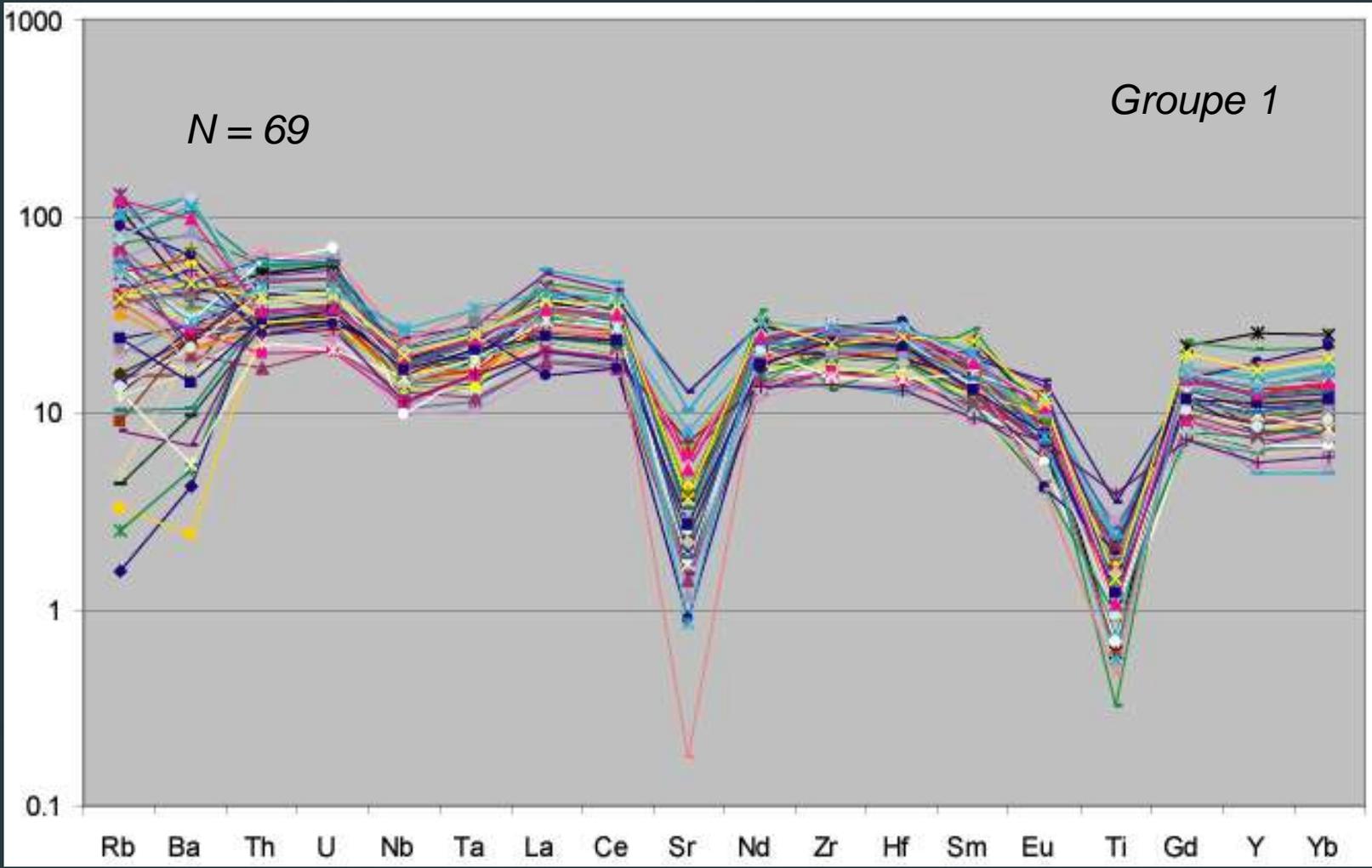
N = 10 067

SiO₂ > 55%
TiO₂ < 1%
Fe₂O₃ < 5%
MgO < 5%



La signature classique des rhyolites

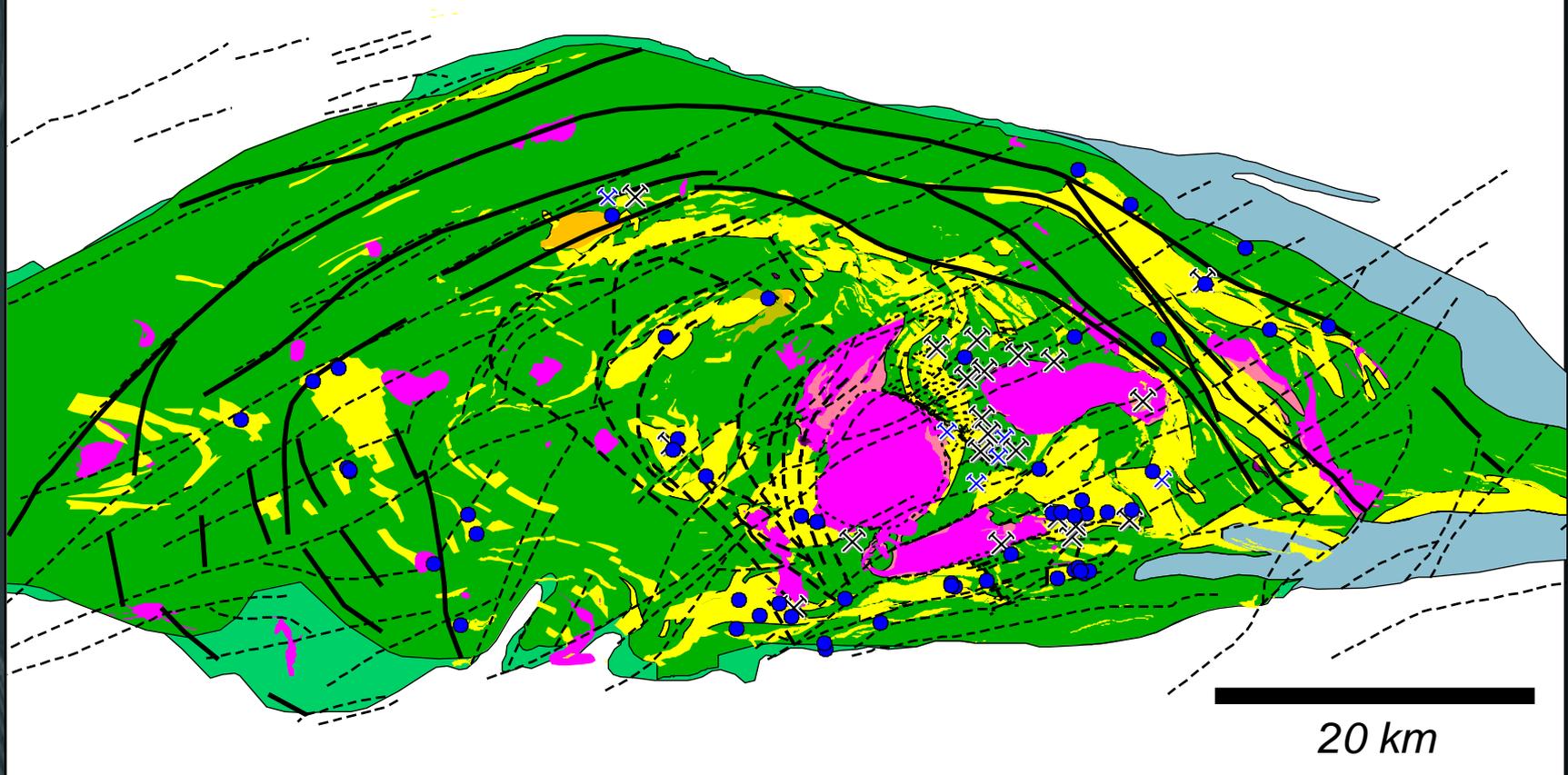
Roches sur Manteau primitif



Données CONSOREM

Distribution des rhyolites « classiques »

Groupe 1

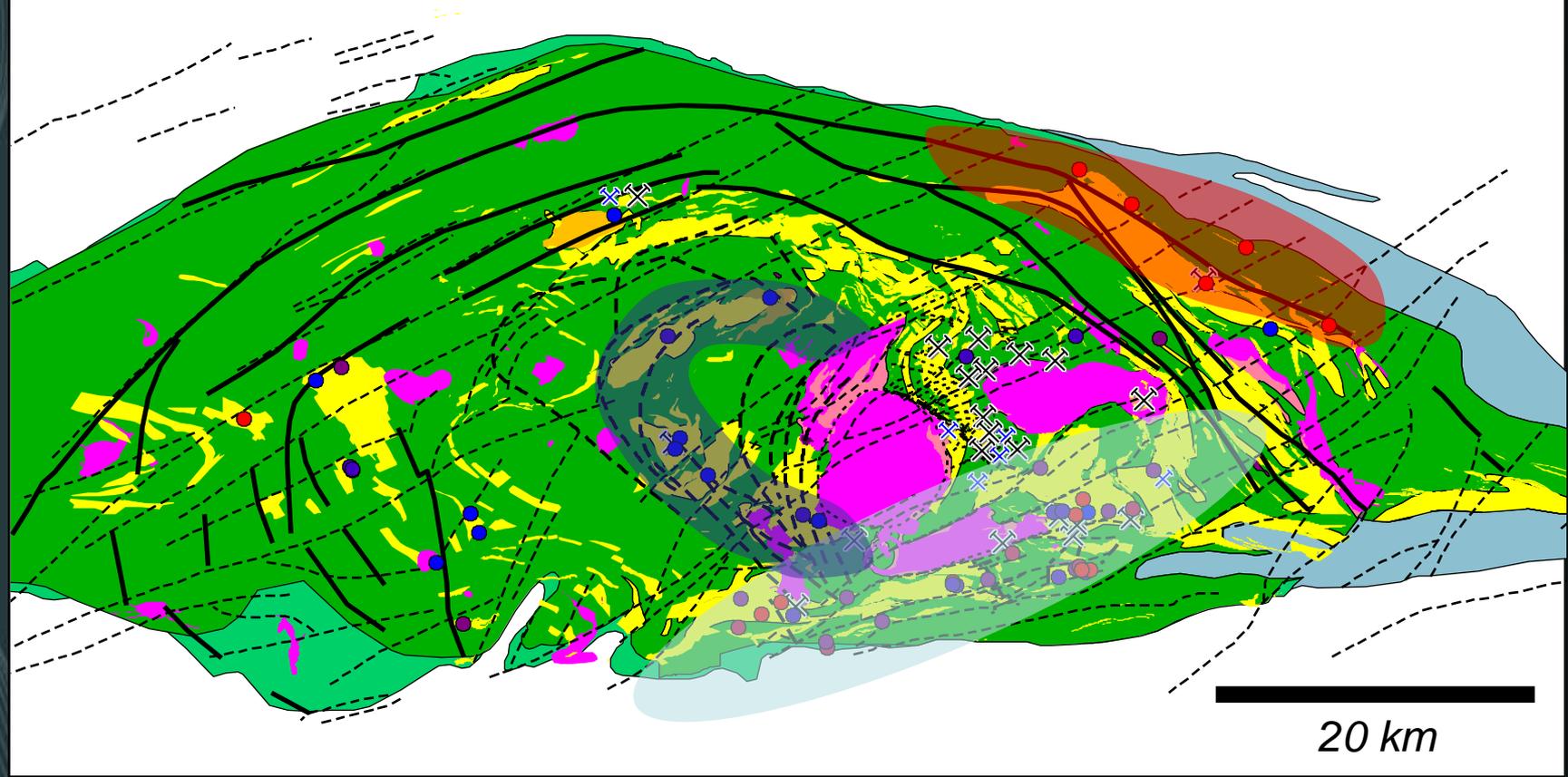


Implication: plusieurs centres d'émission de même source magmatique

La/Yb: Groupe 1

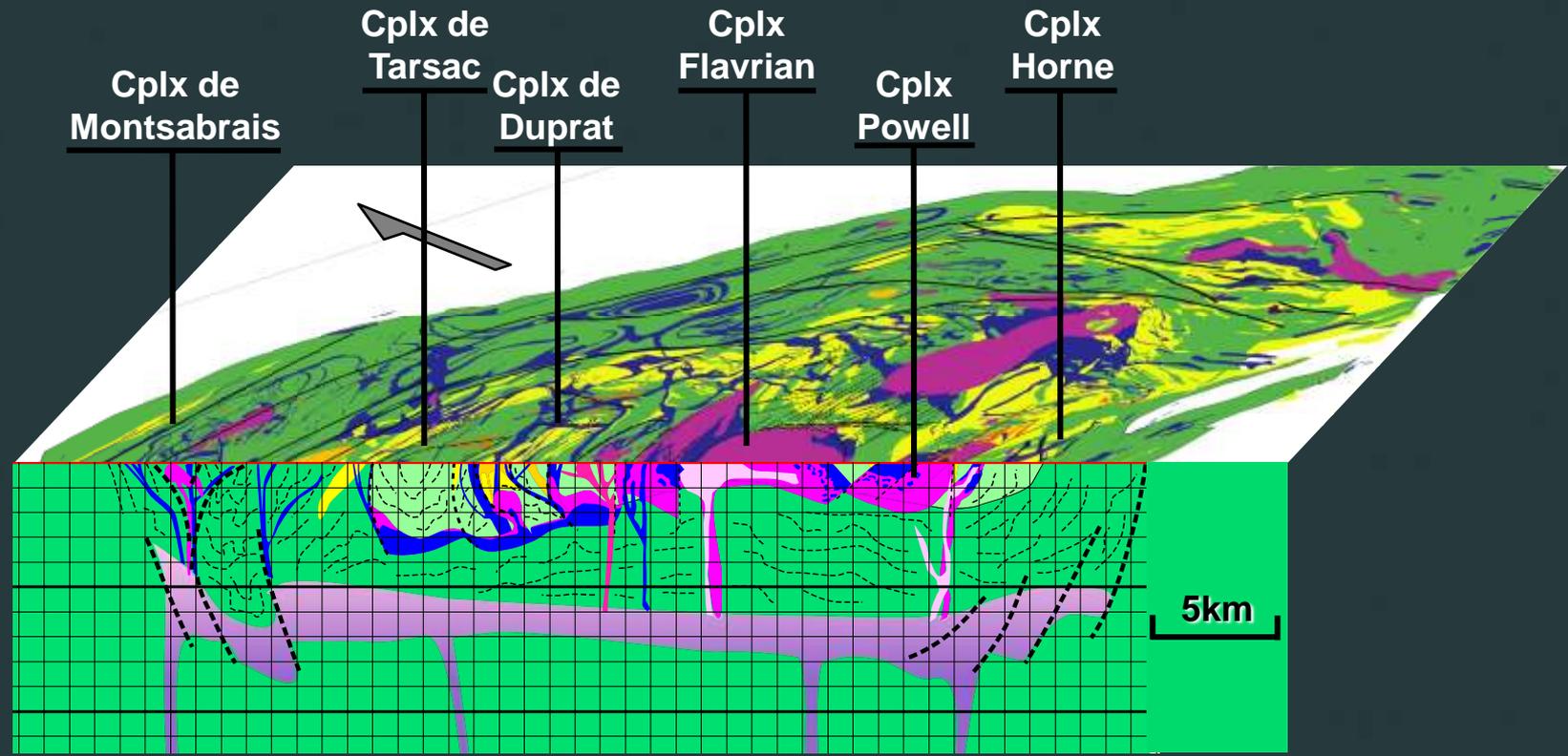
- La/Yb faible
- ↓
- La/Yb fort

Groupe 1



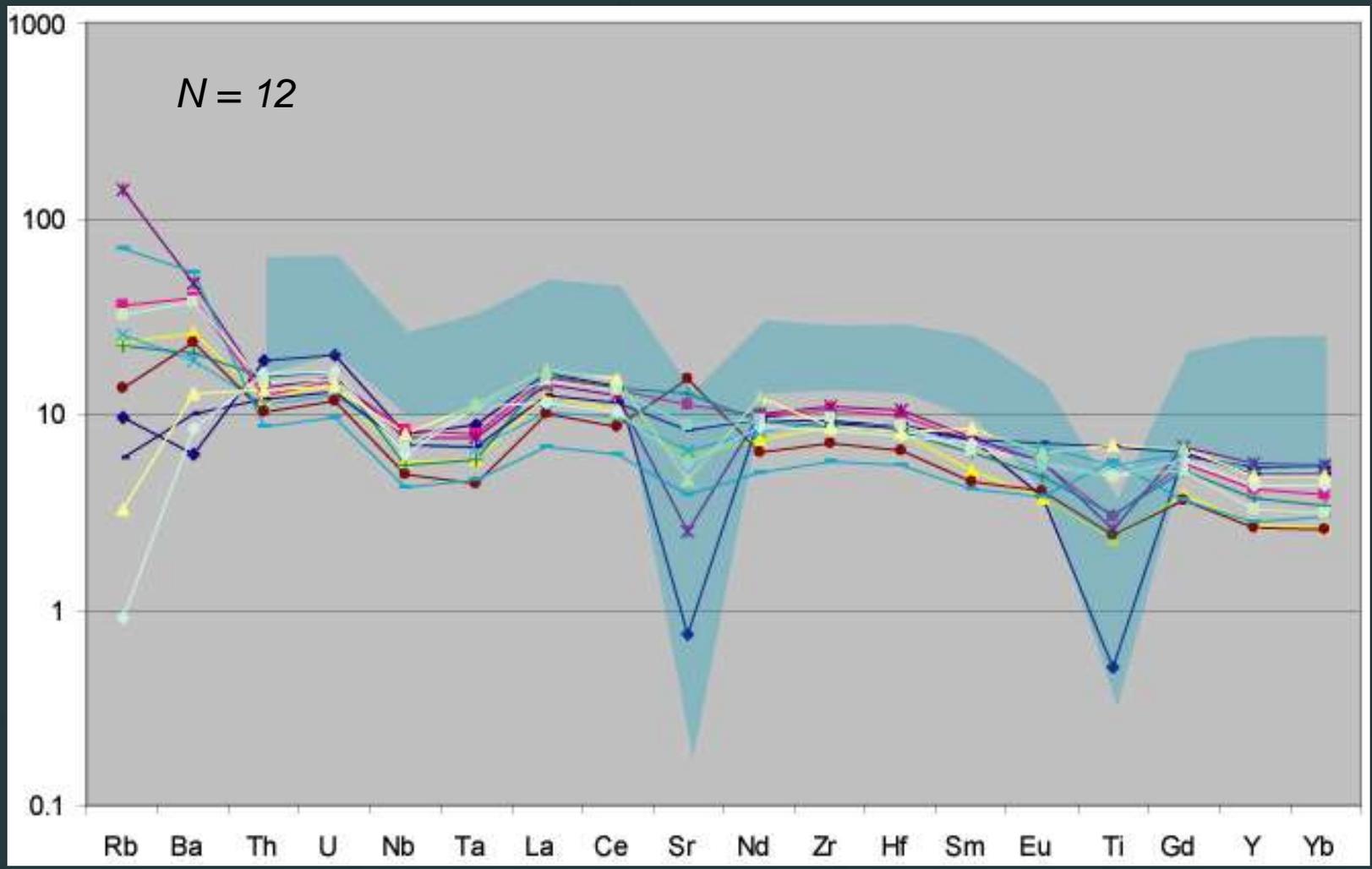
Implication: distribution cohérente avec les structures de caldéiras

Implication génétique: Large chambre magmatique



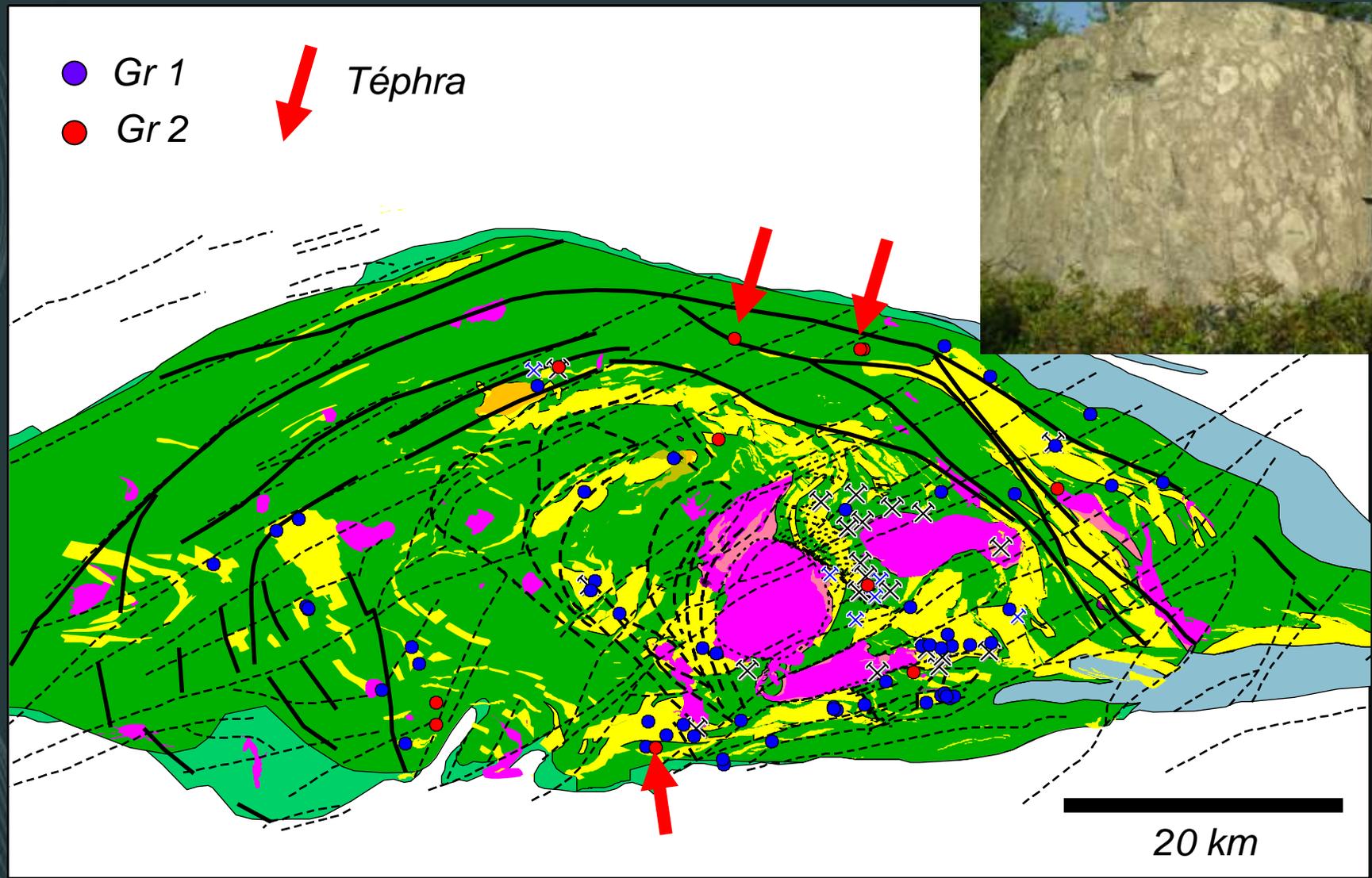
Groupe 2 de rhyolites BR

Roches sur Manteau primitif



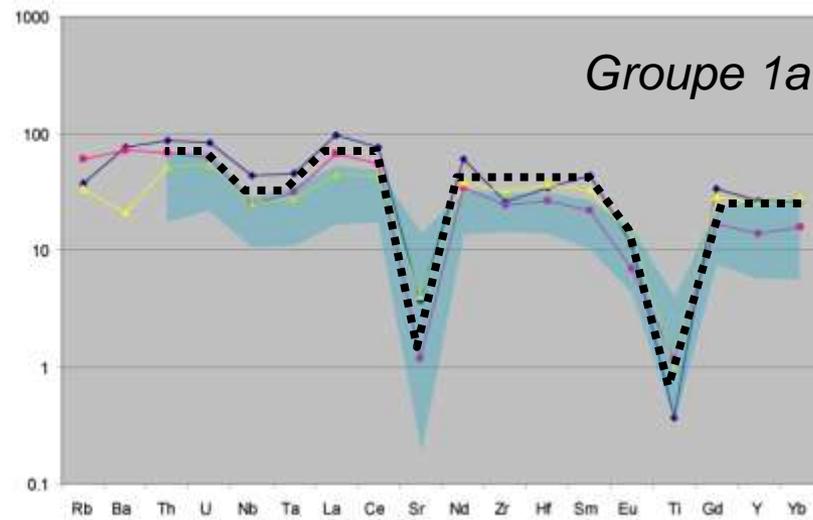
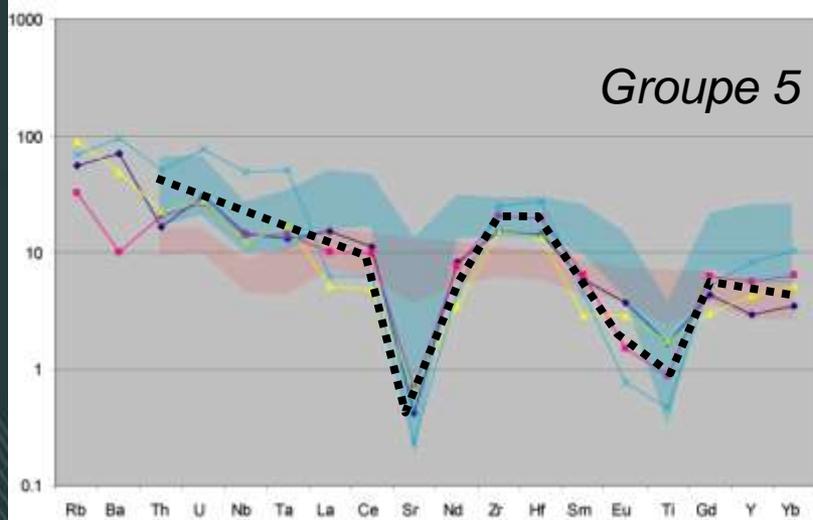
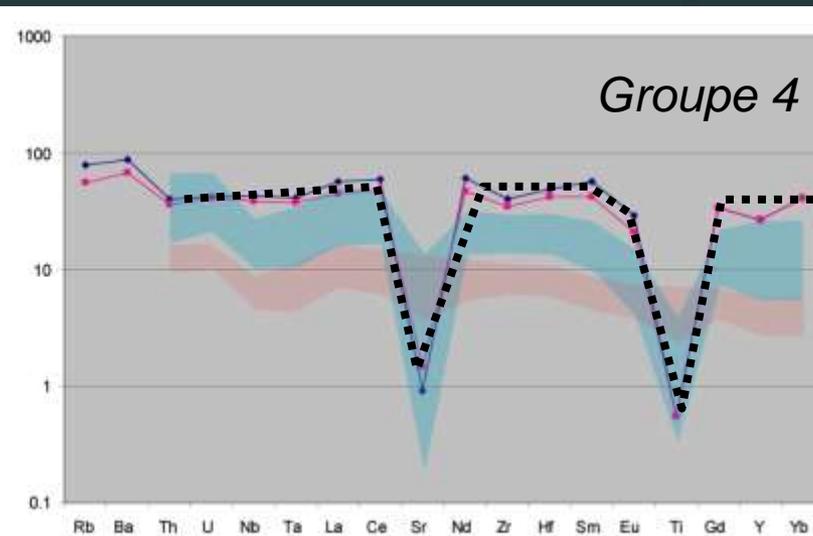
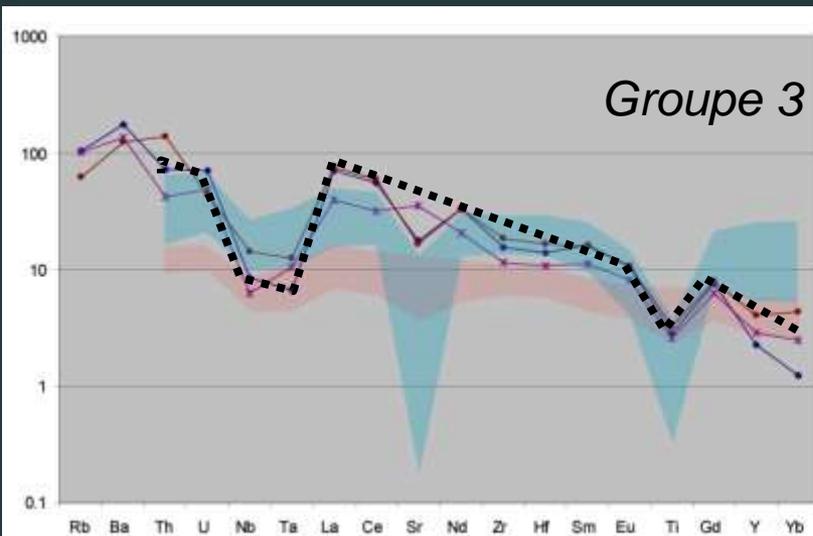
Données CONSOREM

Distribution des rhyolites « Groupe 2 »

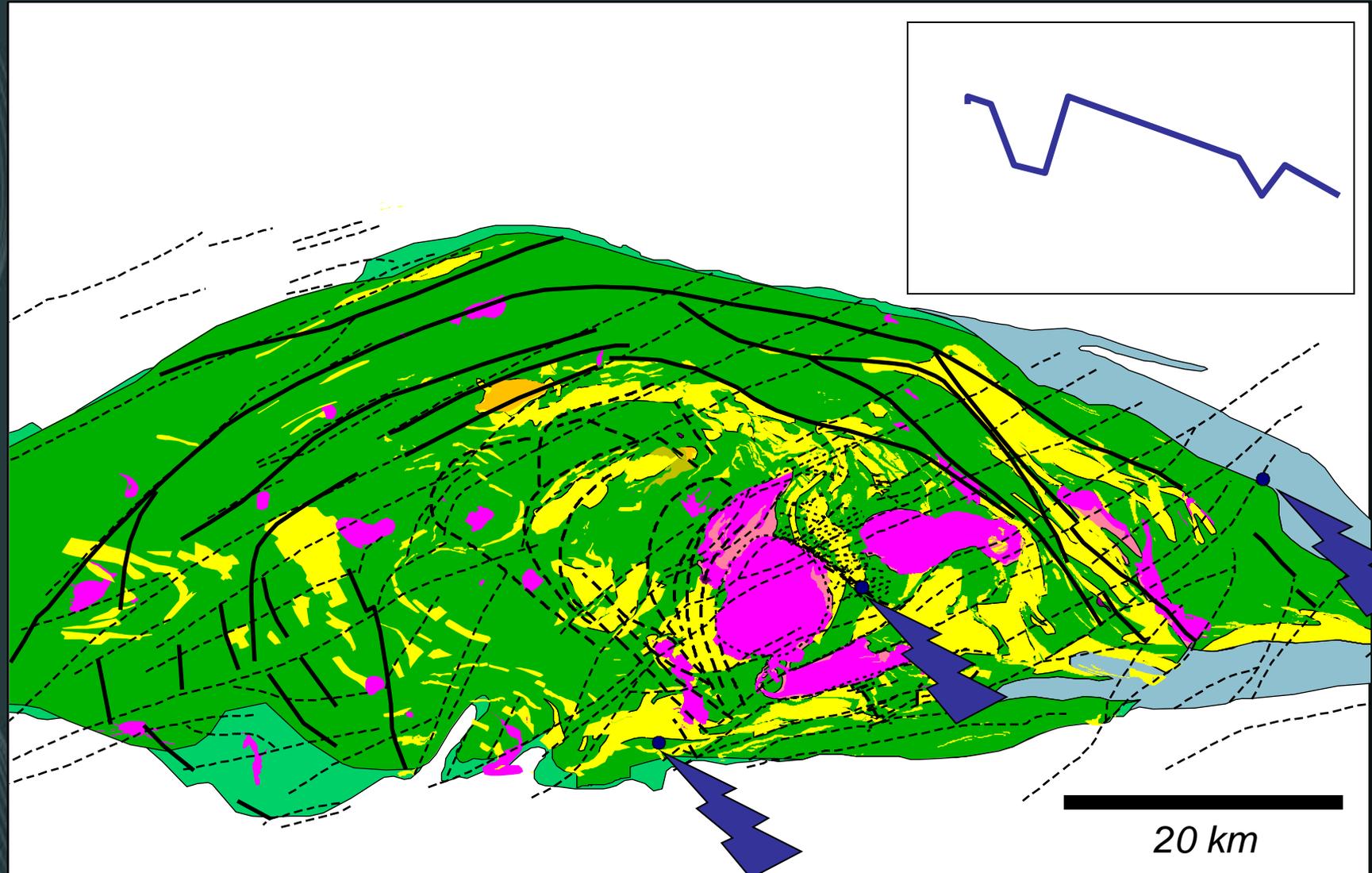


Implication: distribution en périphérie, téphras et laves

Autres groupes de rhyolite

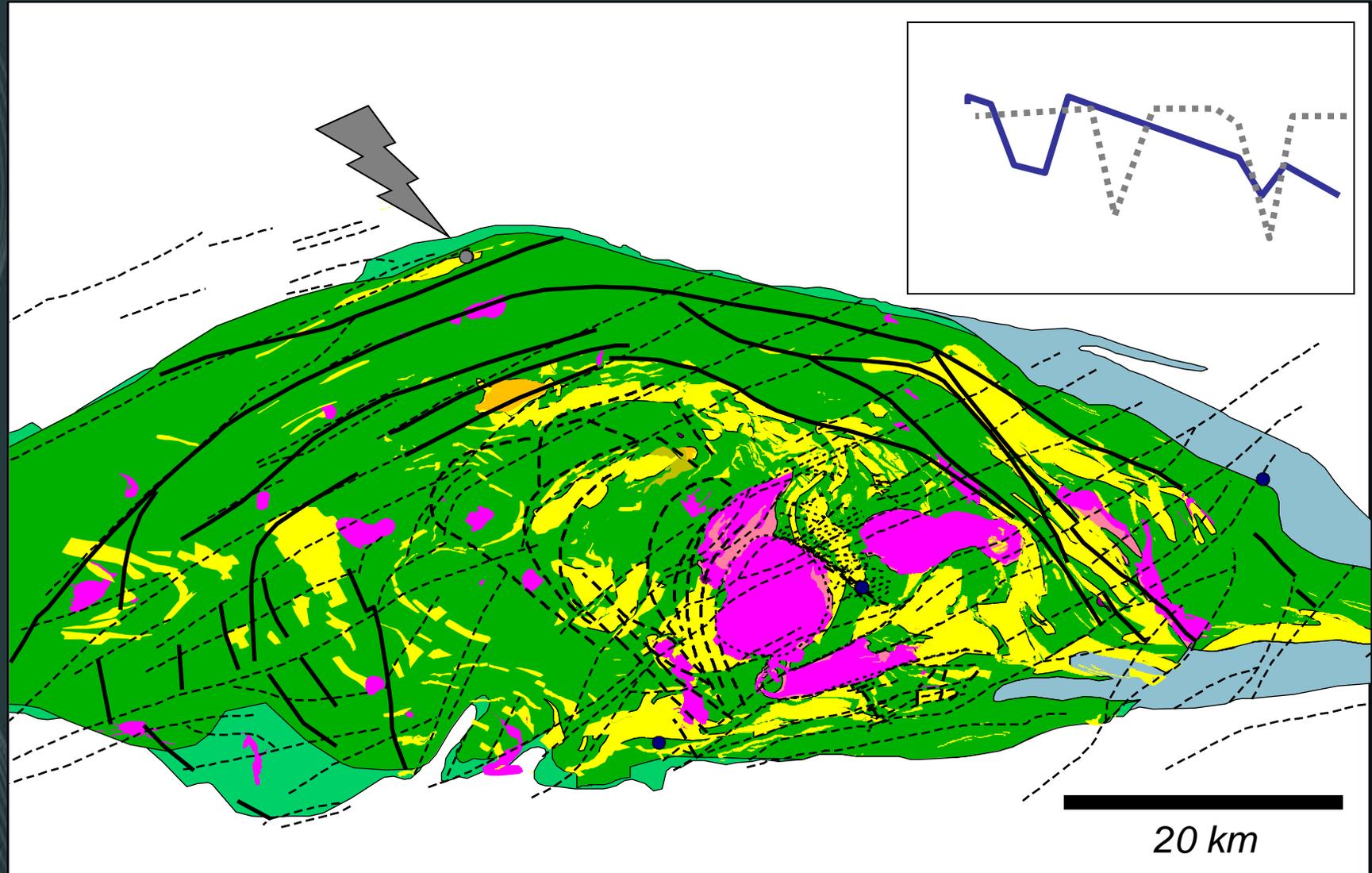


Distribution des rhyolites « Groupe 3 »



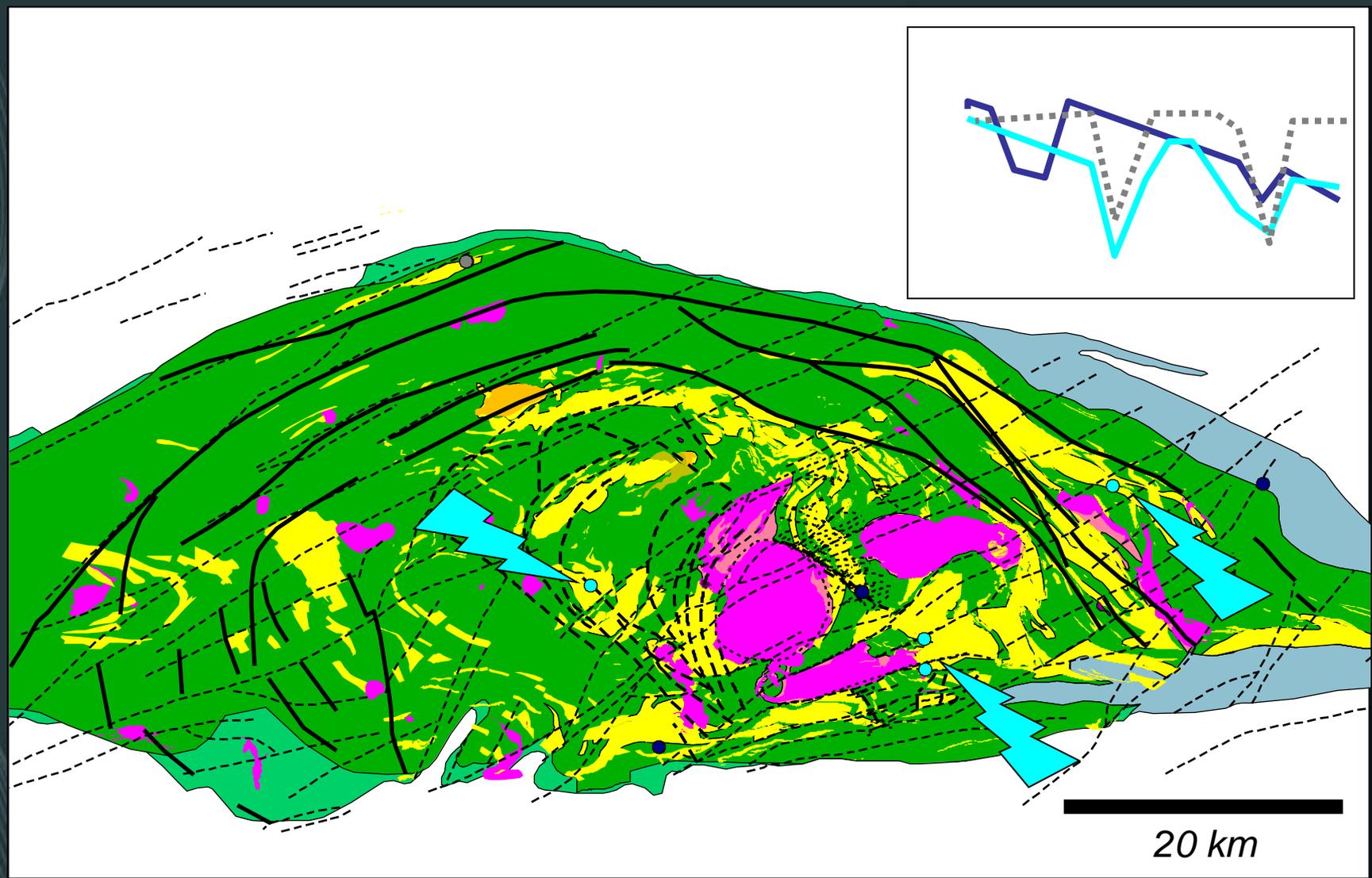
Implication: distribution en périphérie et centre (?)

Distribution des rhyolites « Groupe 4 »



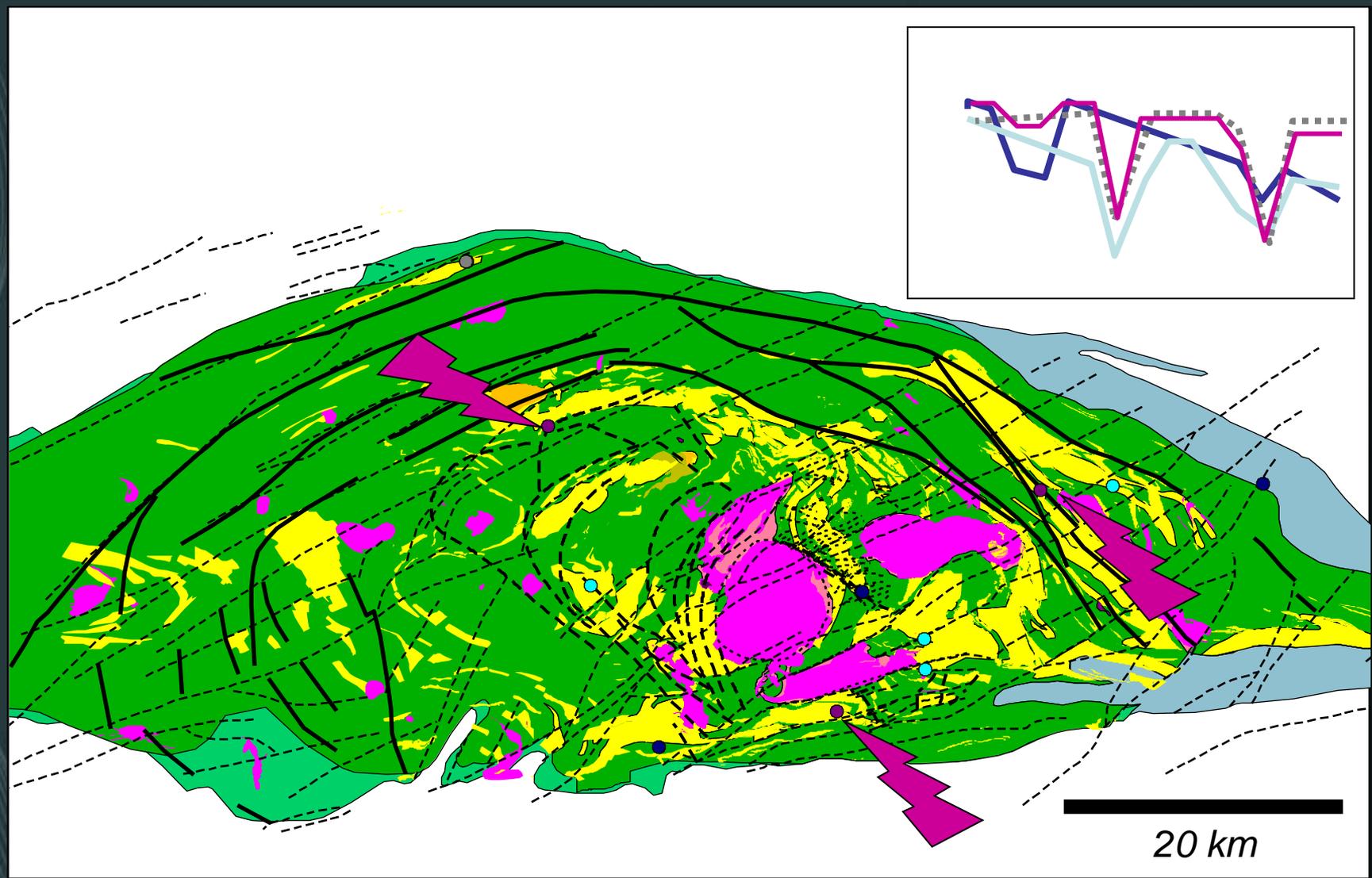
Implication: distribution très localisé, rhyolite type FIIIb

Distribution des rhyolites « Groupe 5 »



Implication: Distribution prêt de gisements VMS, signature altération ?

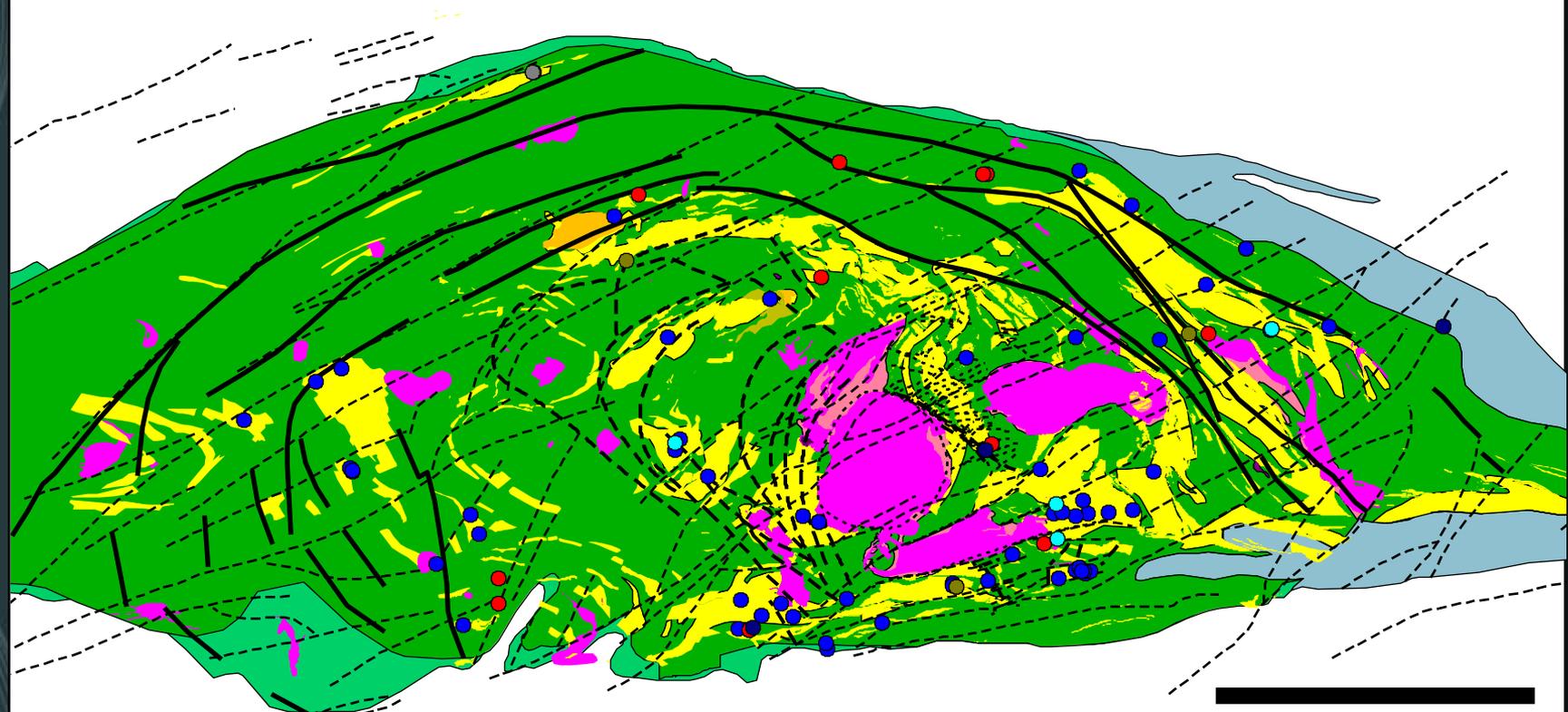
Distribution des rhyolites « Groupe 1a »



Implication: distribution en périphérie New-Senator, Type « classique » enrichi

Distribution des groupes de rhyolites

- Gr 1
- Gr 2
- Gr 3
- Gr 4
- Gr 5
- Gr 1a



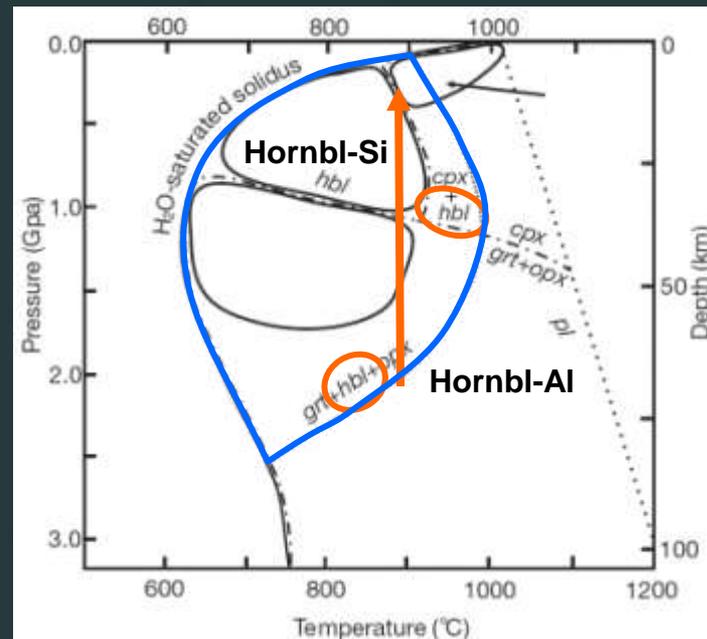
Implication: distribution hétérogène

PER-GH: Fondements

Indice PER Grenat et Hornblende Si-Al

$\text{Ca(Mg,Fe)Si}_2\text{O}_6$: Cpx. : FIII Tholéiitique, méta-alumineux, ETR plat
 $\text{NaCa}_2(\text{Mg,Fe,Al})_5(\text{Al,Si})_8\text{O}_{22}(\text{OH})_2$: Hornbl : FII Transitionnel , peralumineux
 $(\text{Mg,Fe})\text{SiO}_3$: Opx. : FI Calc-alcalin
 $(\text{Mg,Fe})_3\text{Al}_2(\text{SiO}_4)_3$: Grenat : FI ETR lourds appauvris

		Cations									
		Si	Ti	Al	Fe	Mg	Ca	Na	K	P	O
Ab	3	0	1	0	0	0	1	0	0	0	8
An	2	0	2	0	0	1	0	0	0	0	8
Fo	1	0	0	0	2	0	0	0	0	0	4
Fa	1	0	0	2	0	0	0	0	0	0	4
Dp	2	0	0	0	1	1	0	0	0	0	6
Hd	2	0	0	1	0	1	0	0	0	0	6
En	2	0	0	0	2	0	0	0	0	0	6
Fs	2	0	0	2	0	0	0	0	0	0	6
Or	3	0	1	0	0	0	0	1	0	0	8
Ap	0	0	0	0	0	5	0	0	3	12	
Mt	0	0	0	3	0	0	0	0	0	4	
Uv	0	1	0	2	0	0	0	0	0	4	
Sp	0	0	2	1	0	0	0	0	0	4	
Hm	0	0	0	2	0	0	0	0	0	3	
Il	0	1	0	1	0	0	0	0	0	3	
cpx	3	0	2	0	3	0	0	0	0	12	
Al	3	0	2	3	0	0	0	0	0	12	
Gr	3	0	2	0	0	3	0	0	0	12	
HAl	6	0	3	2	2	2	1	0	0	22	
HSi	7	0	1	3	2	2	1	0	0	22	

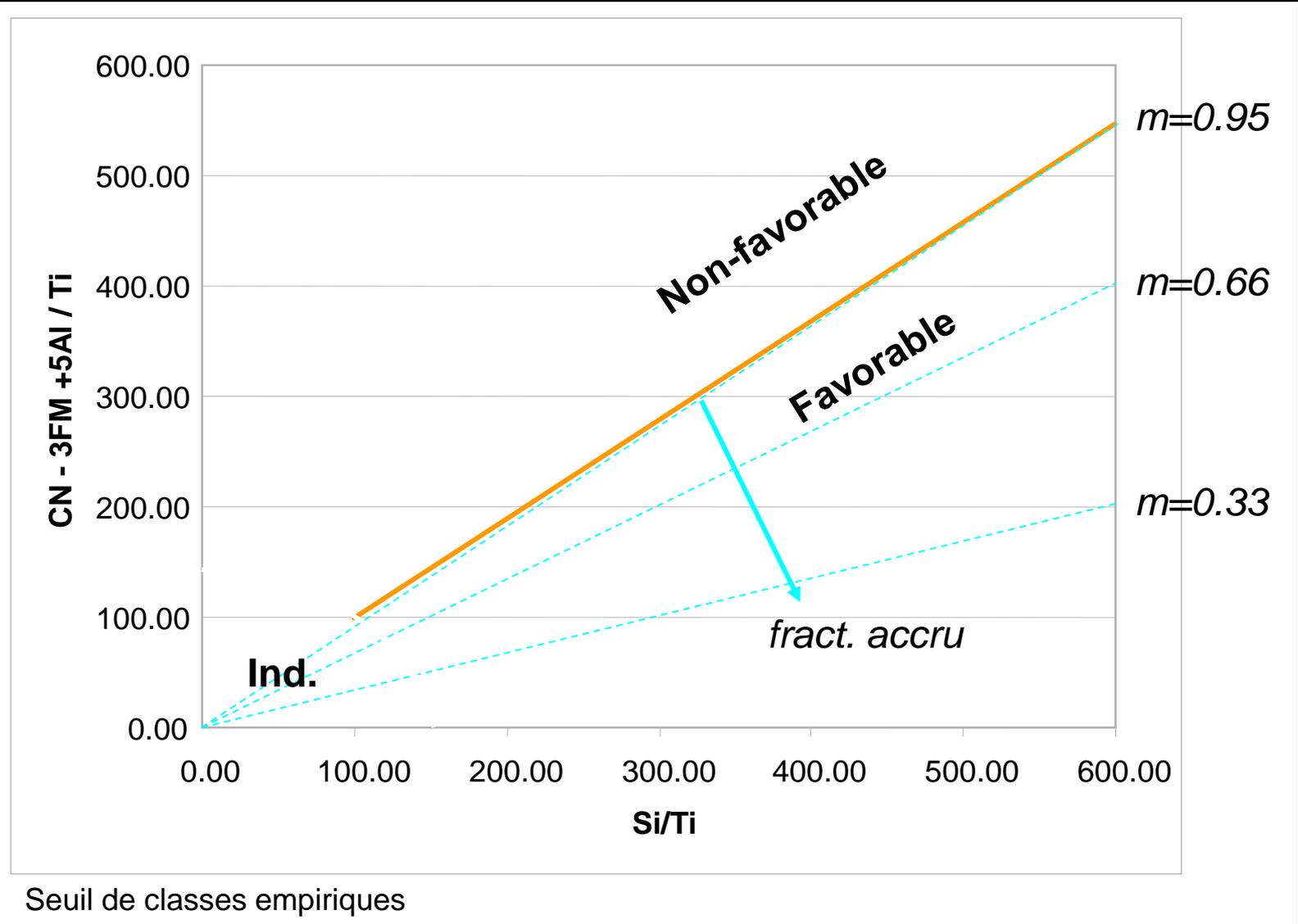


Hart et al., 2004

Rutherford and Devine (2003)

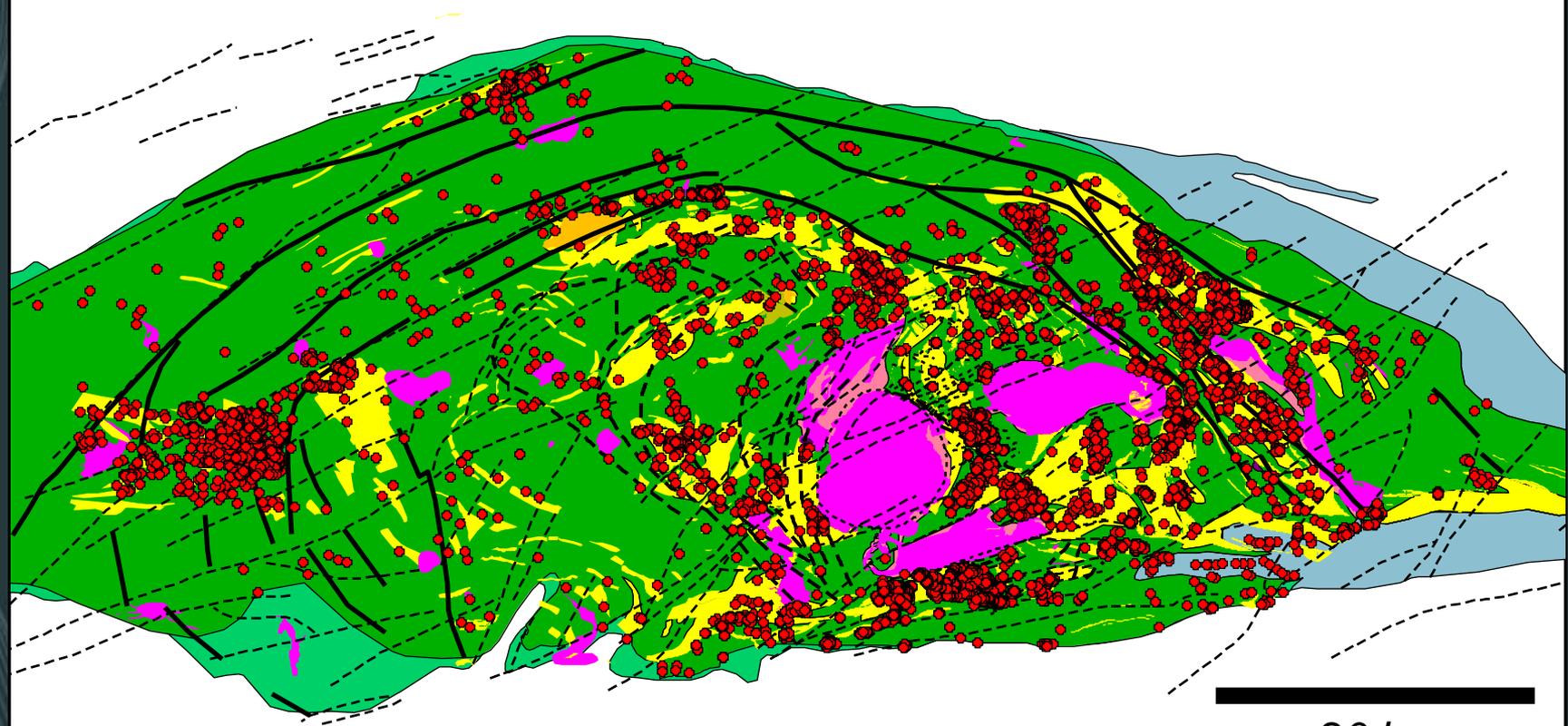
Russel, J.K. and Stanley, C.R. 1990. Geol. Ass. Can., Short Course Vol. 8, 310p.

Per-GH: Mode d'utilisation



Rhyolites: données Norex

N = 10 067



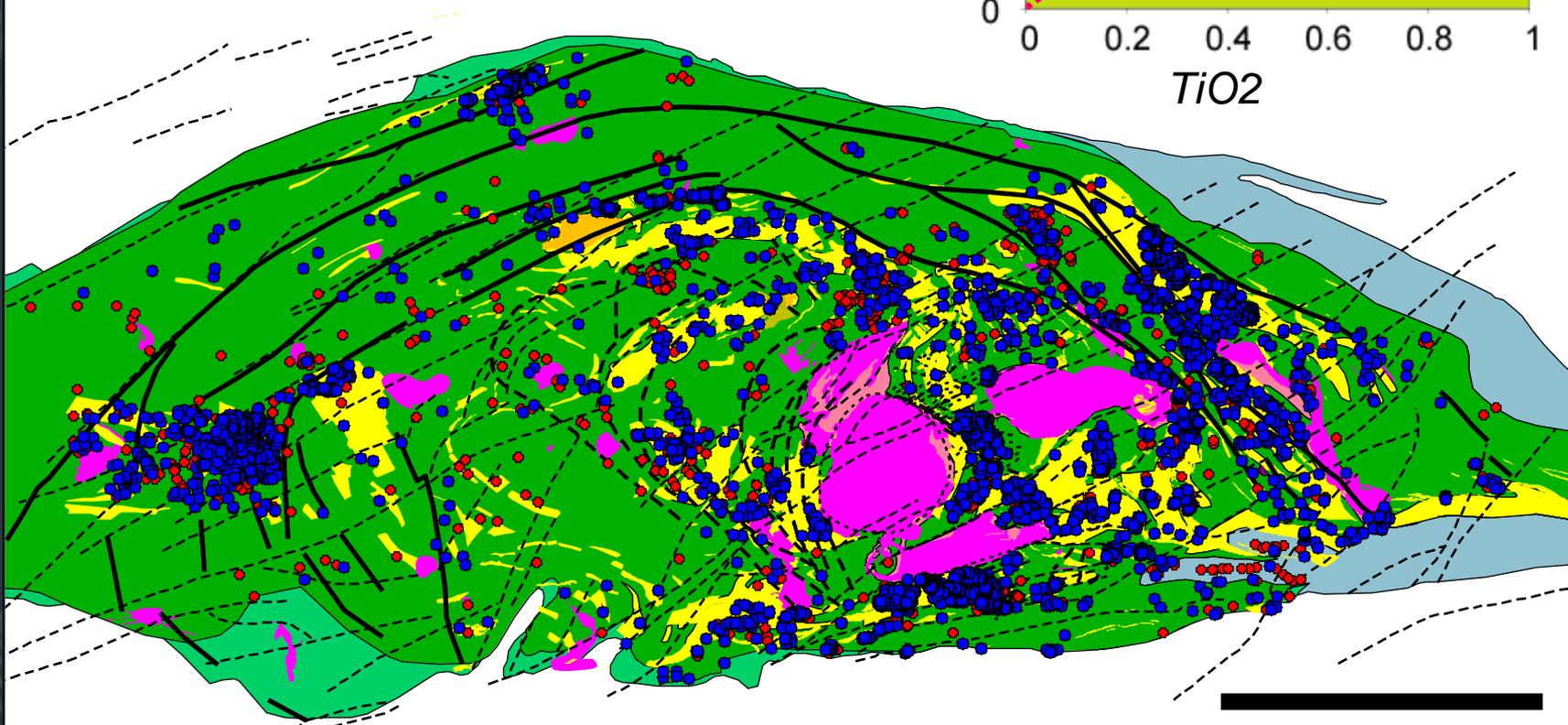
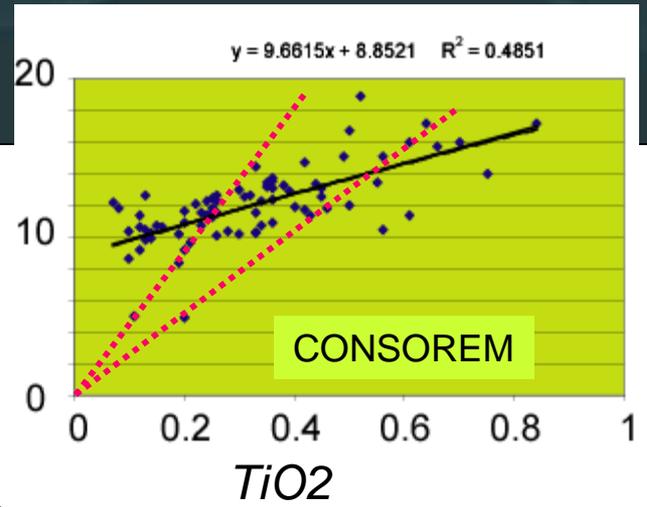
20 km

Rhyolites: fraïches

N = 7 207

- *Rhyolite fraïche*
- *Rhyolite*

A/2O3

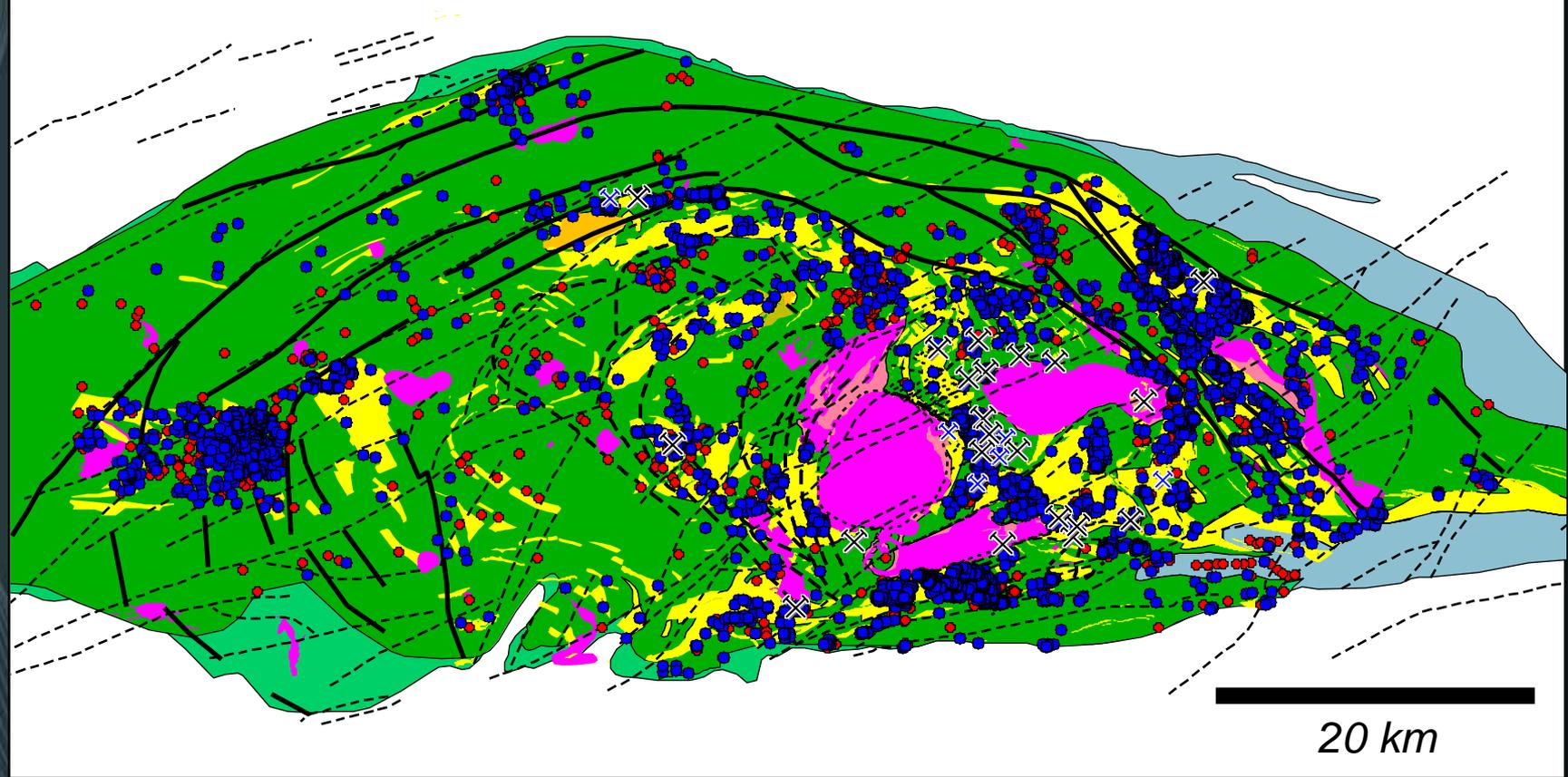


20 km

Rhyolites et SMV

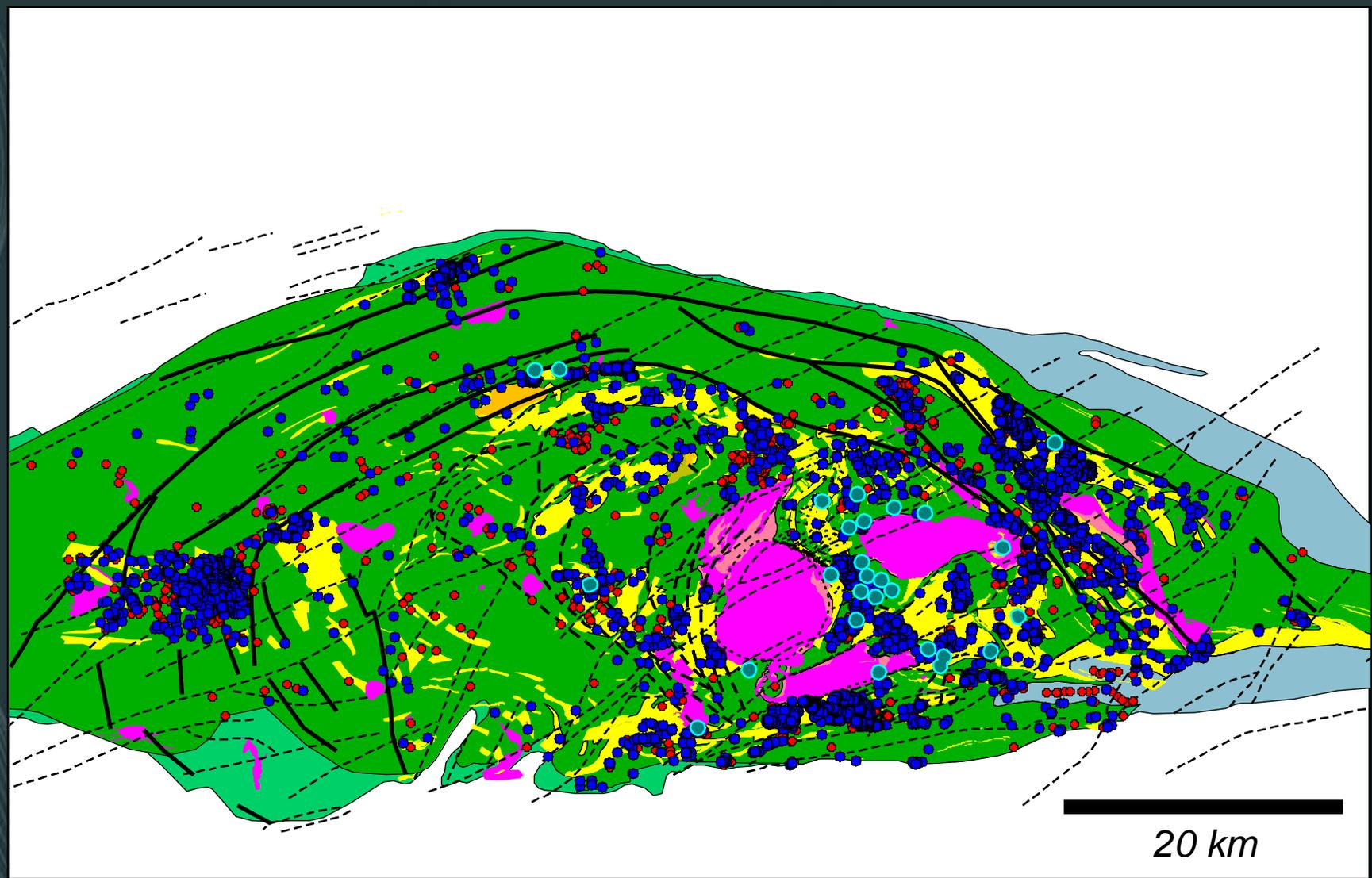
N = 27

- Rhyolite fraîche
- Rhyolite

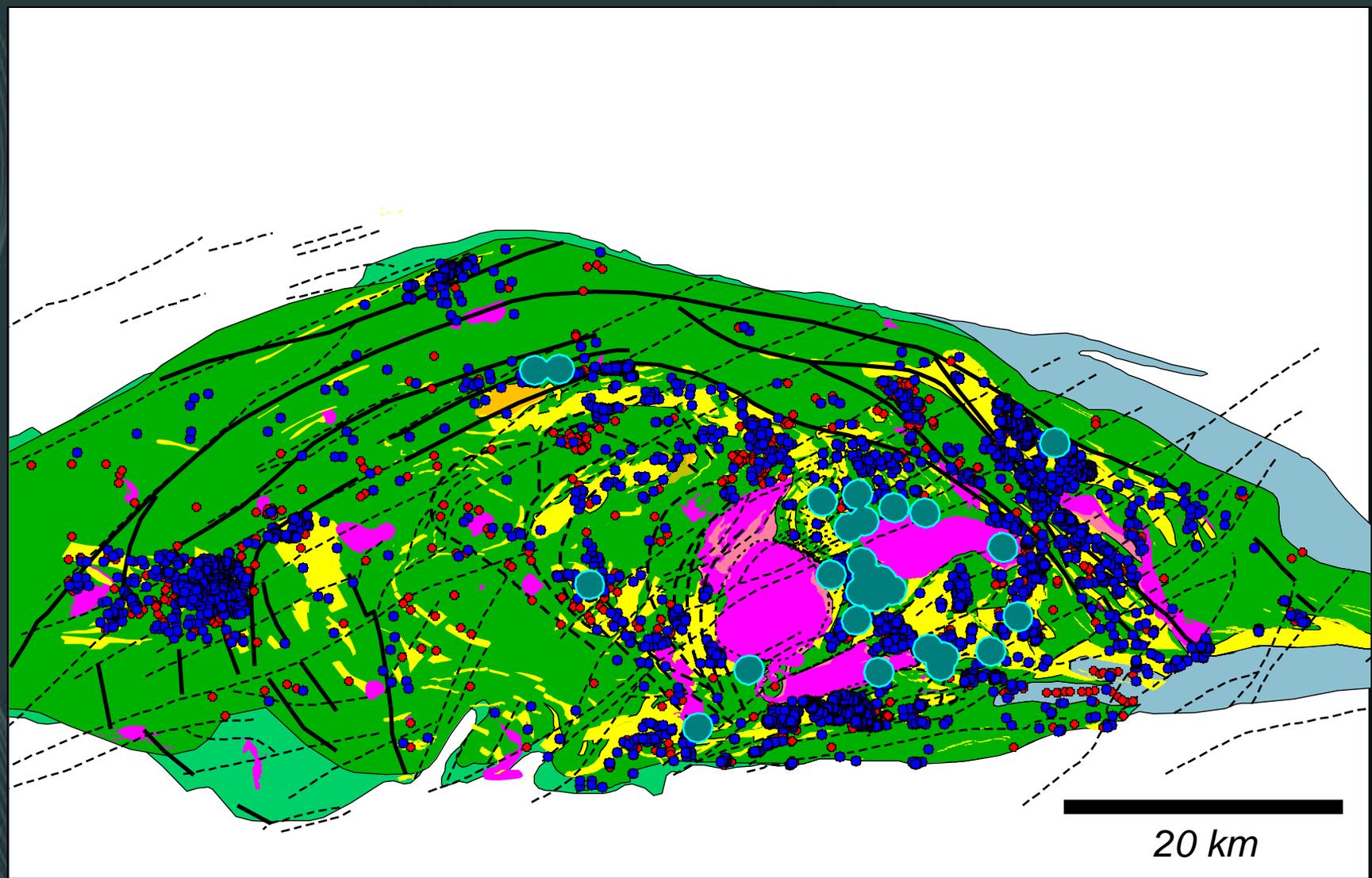


20 km

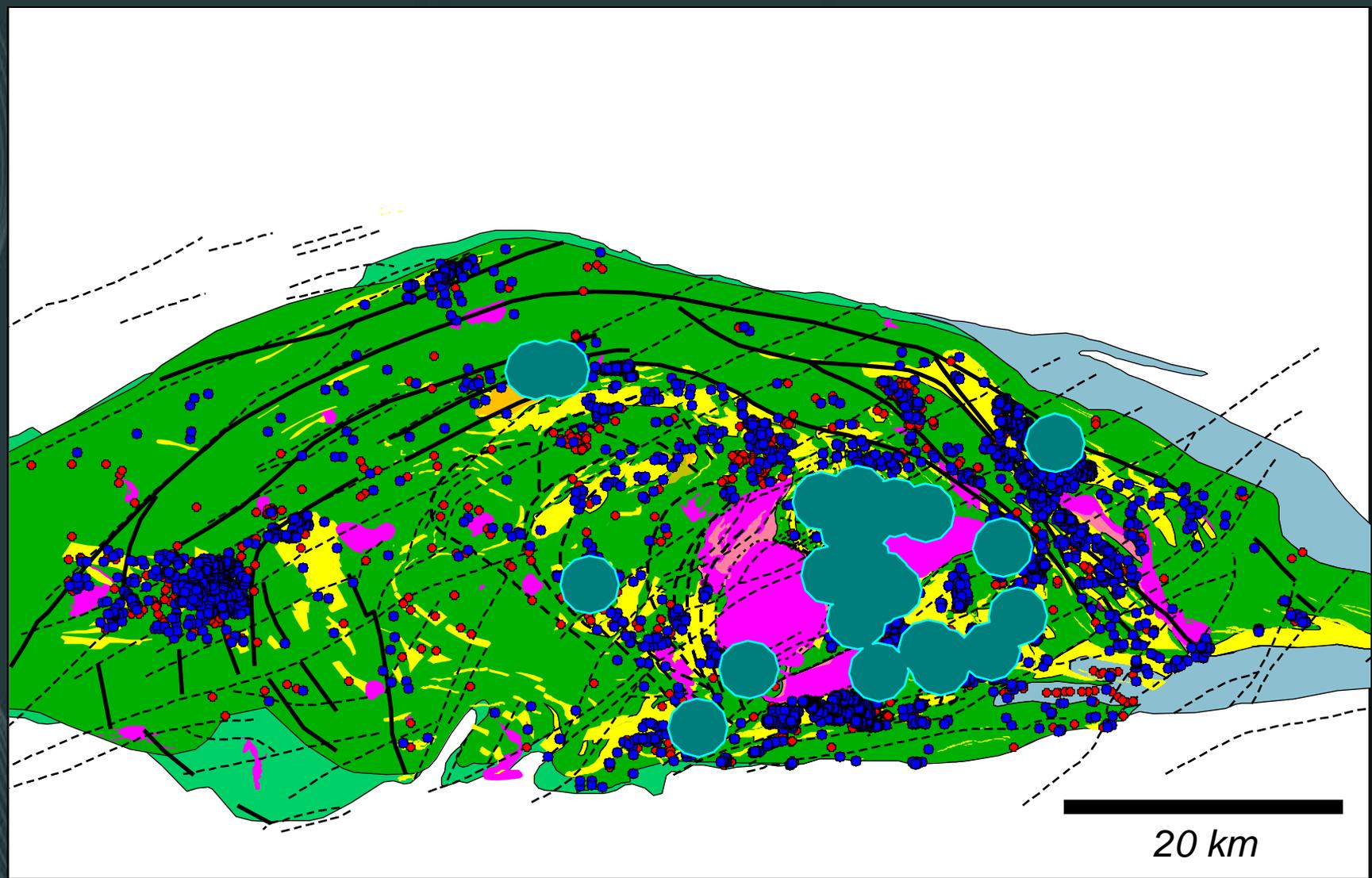
Rhyolites: zone tampon 500 m autour VMS



Rhyolites: zone tampon 1000 m autour VMS

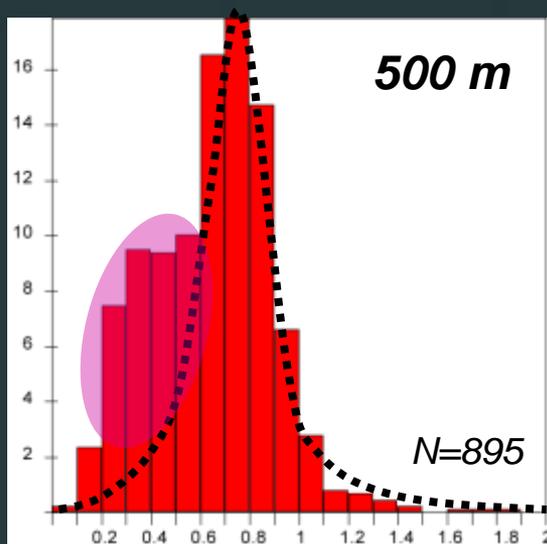


Rhyolites: zone tampon 2000 m autour VMS

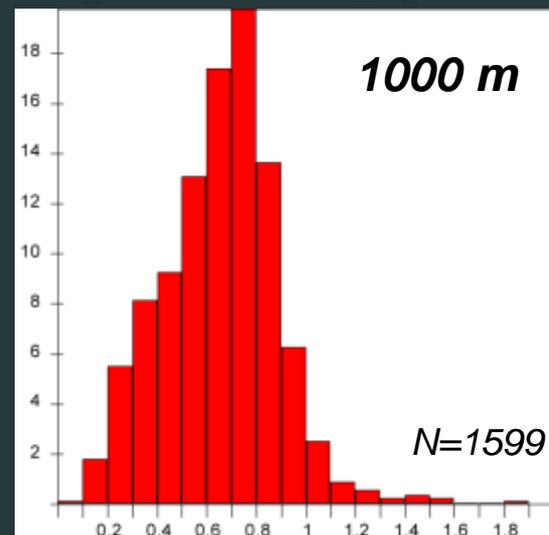


Histogramme PER-GH: rhyolites

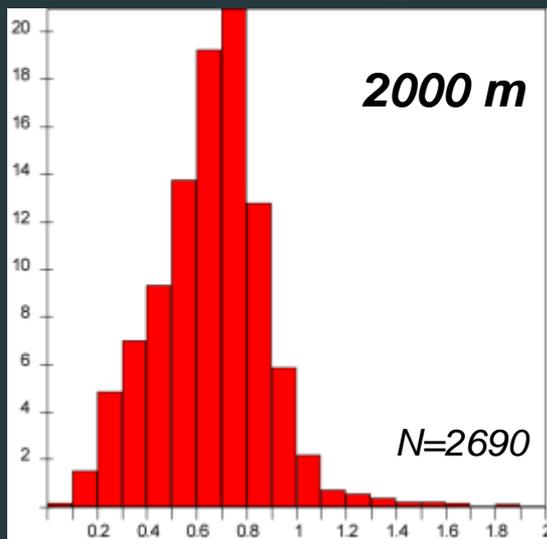
Fréquence cumulative en %



Fréquence cumulative en %

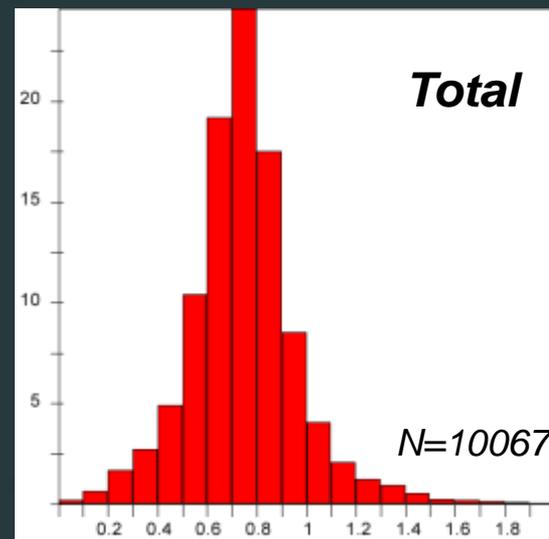


Fréquence cumulative en %



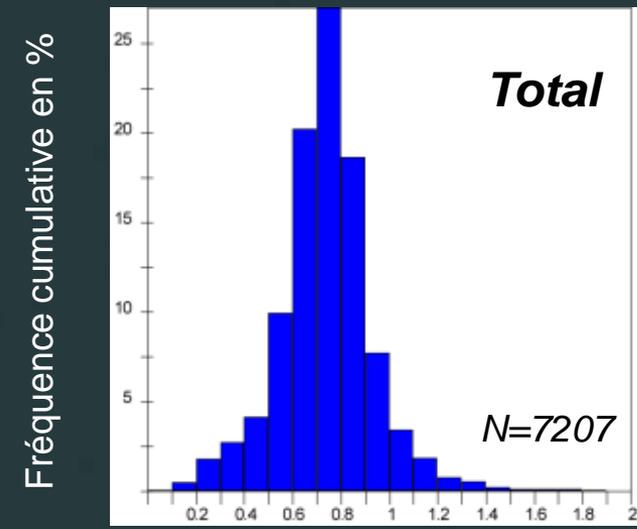
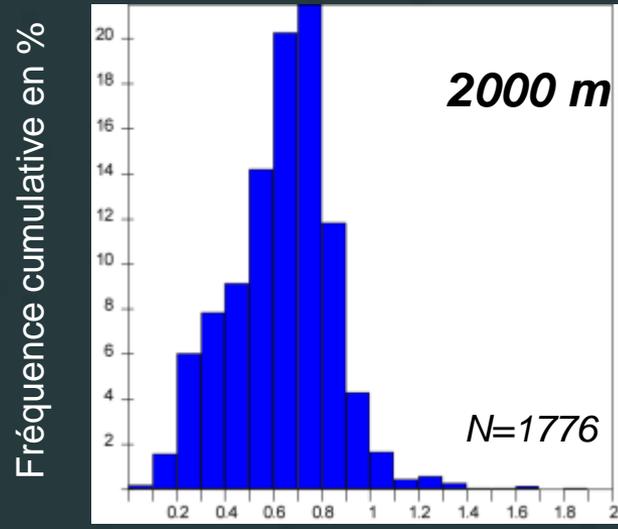
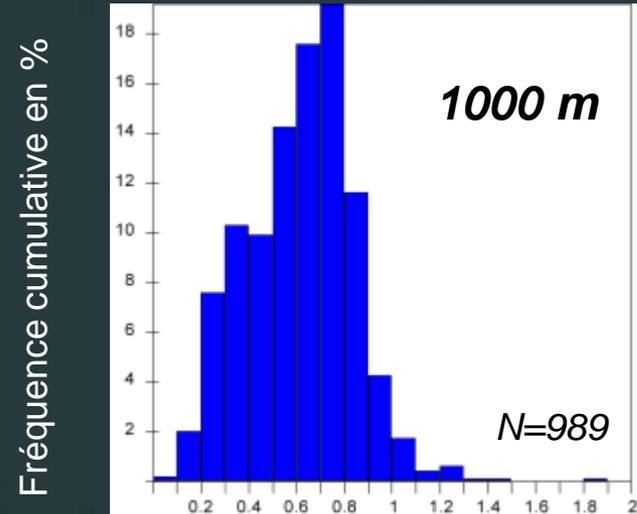
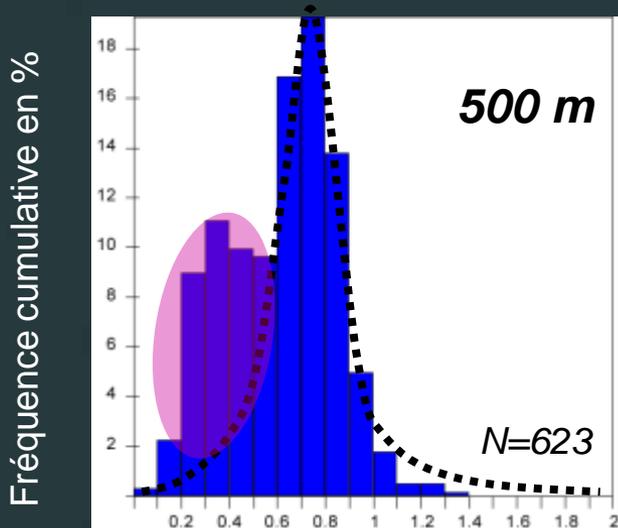
PER-GH

Fréquence cumulative en %



PER-GH

Histogramme PER-GH: rhyolites fraîches

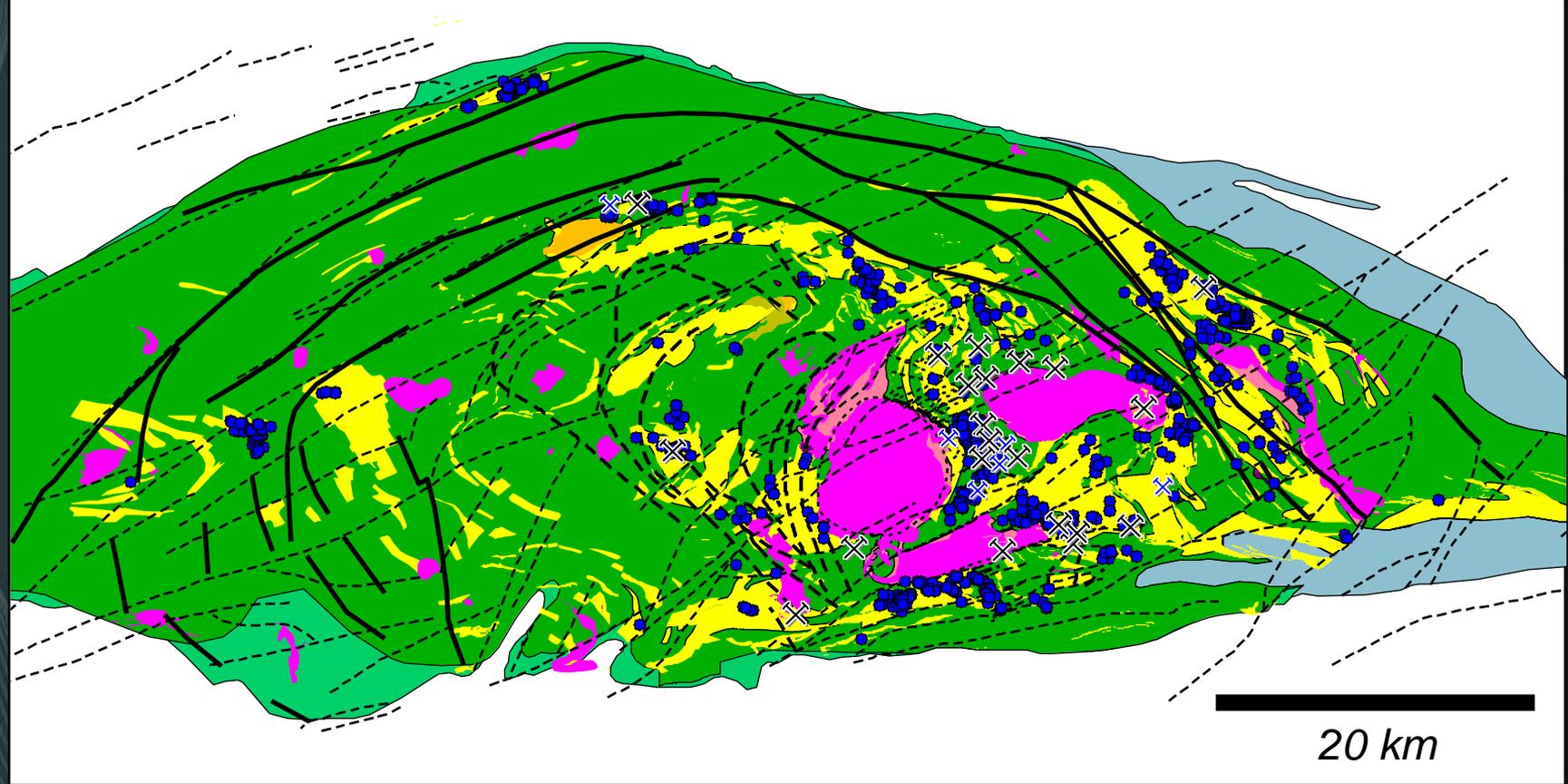


PER-GH

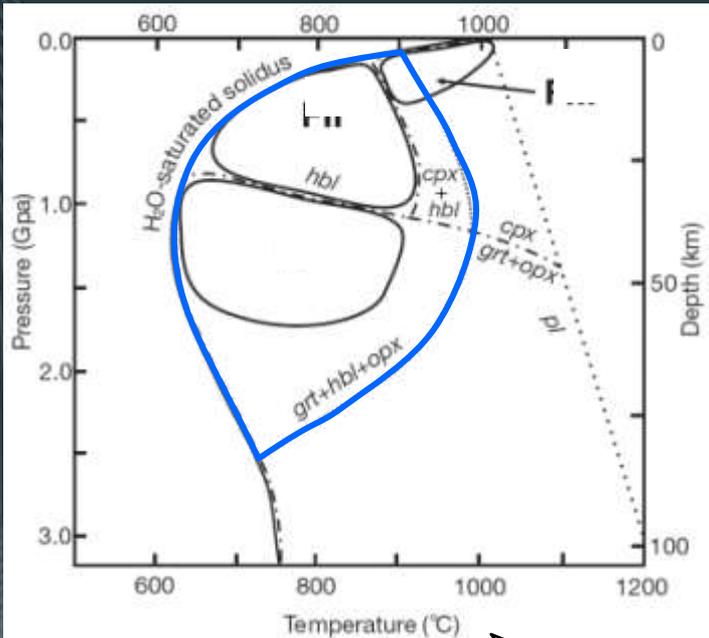
PER-GH

PER-GH: 0.2 - 0.6

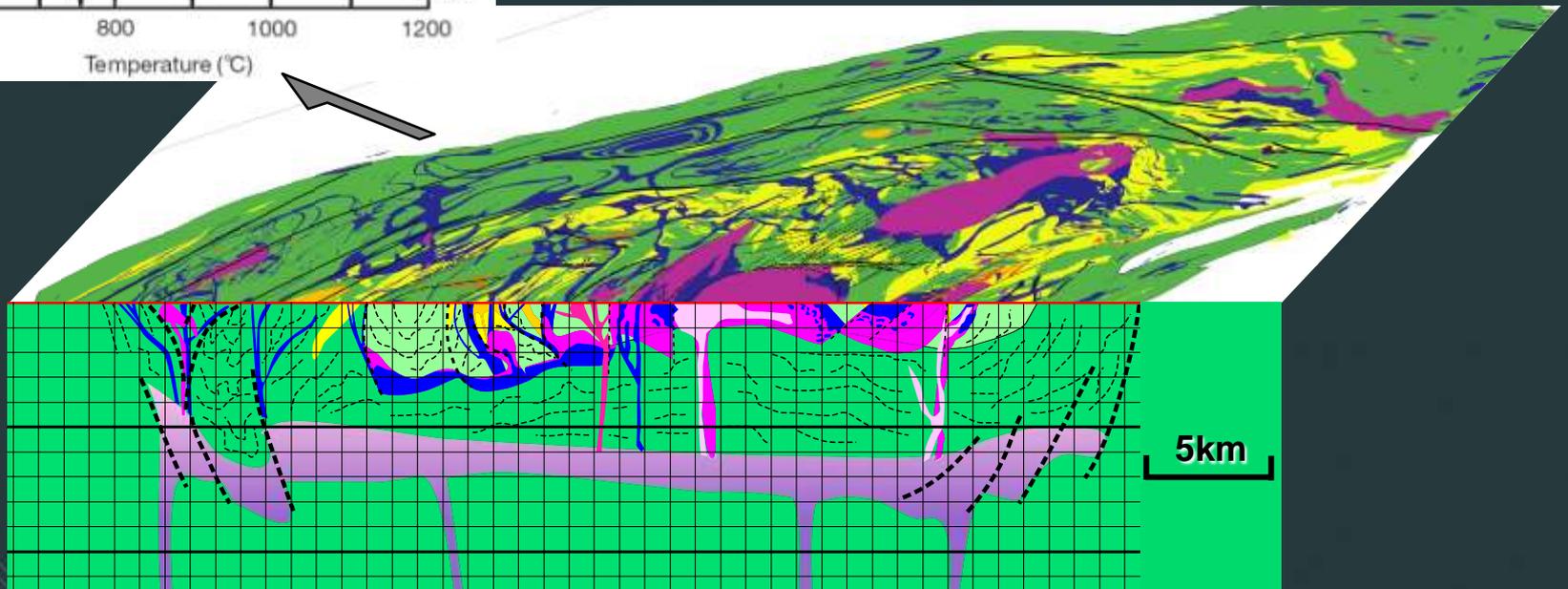
potentiel SMV



Constat: PER-GH indicateur pétrogénétique

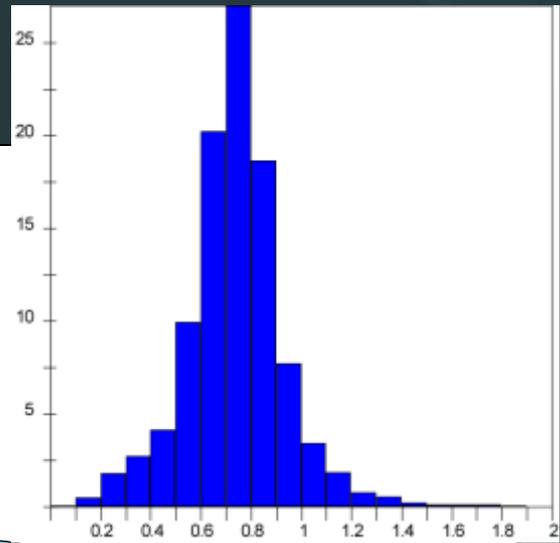
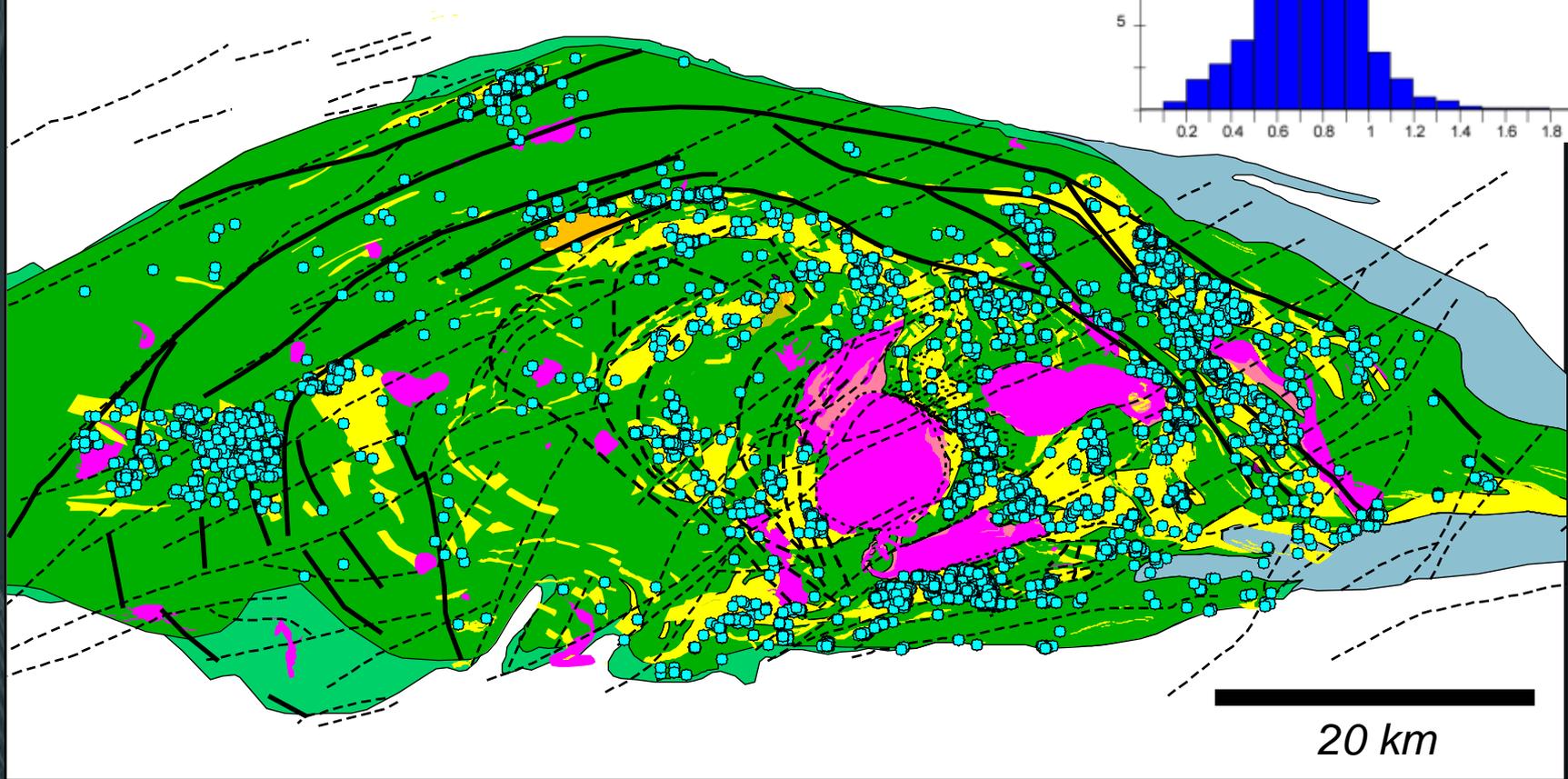


PER-GH des rhyolites pour contraindre l'évolution de la profondeur de génération du magma felsique ?

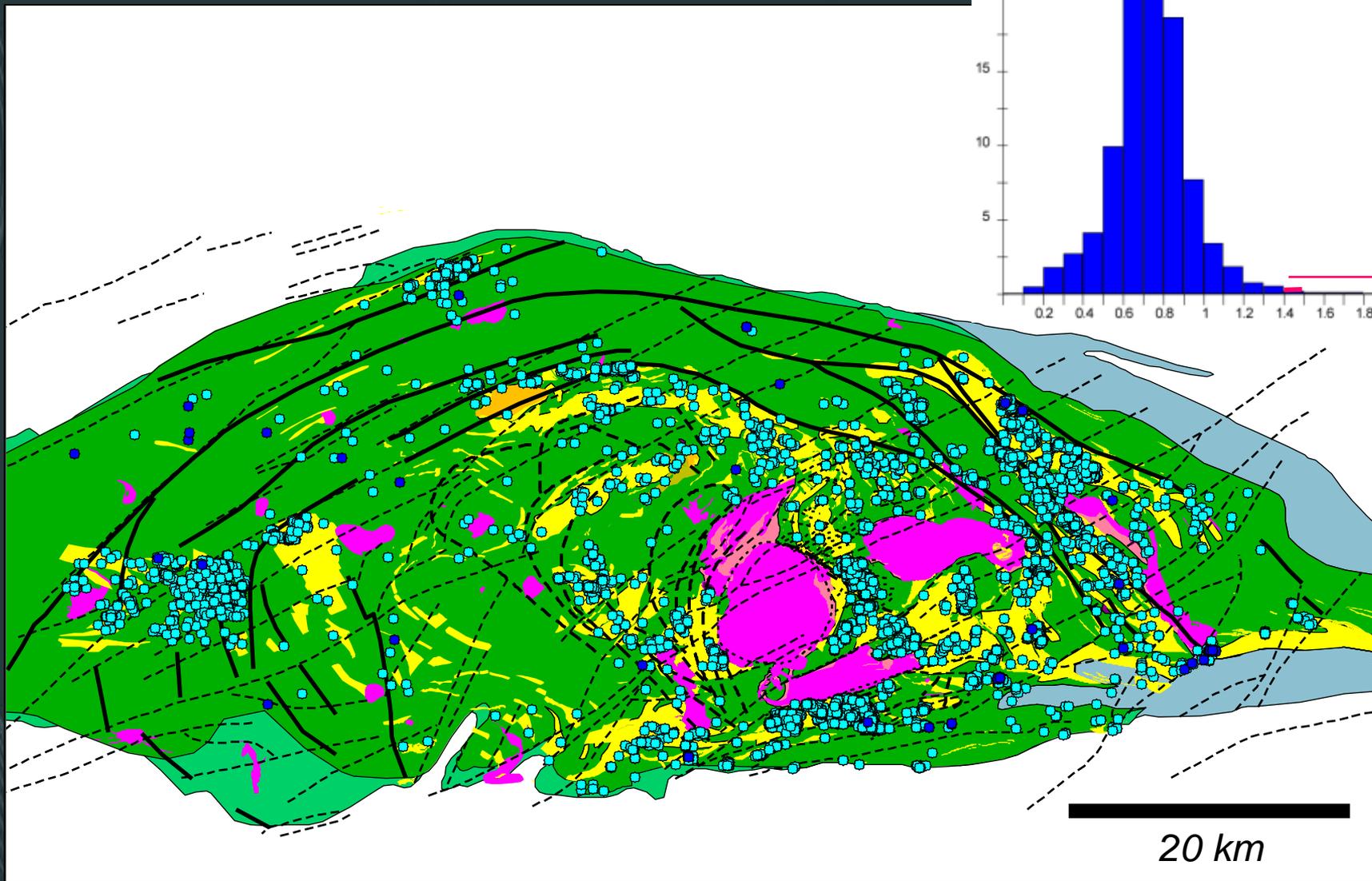


Rhyolites « Fraîches », total

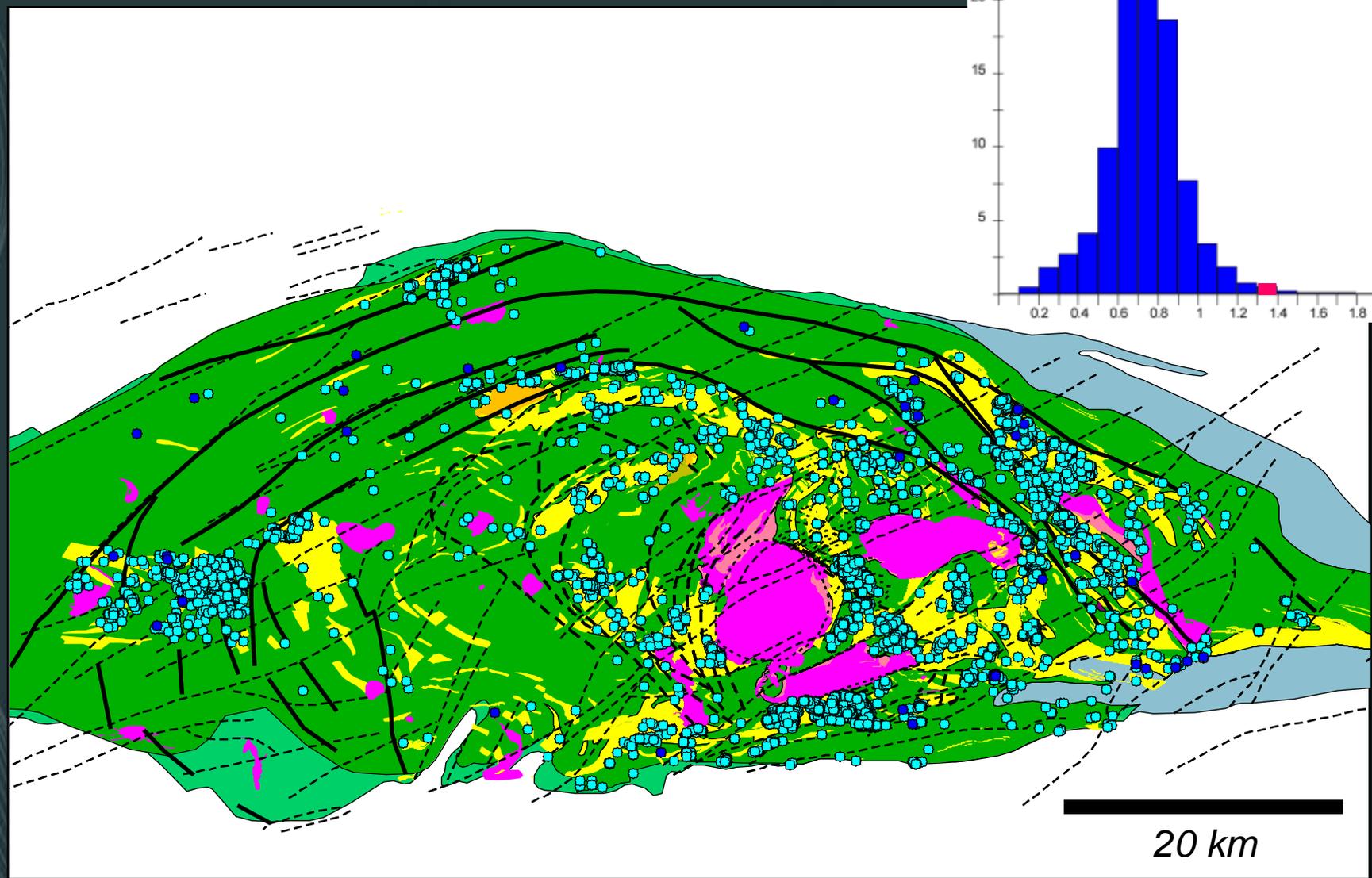
N=7207



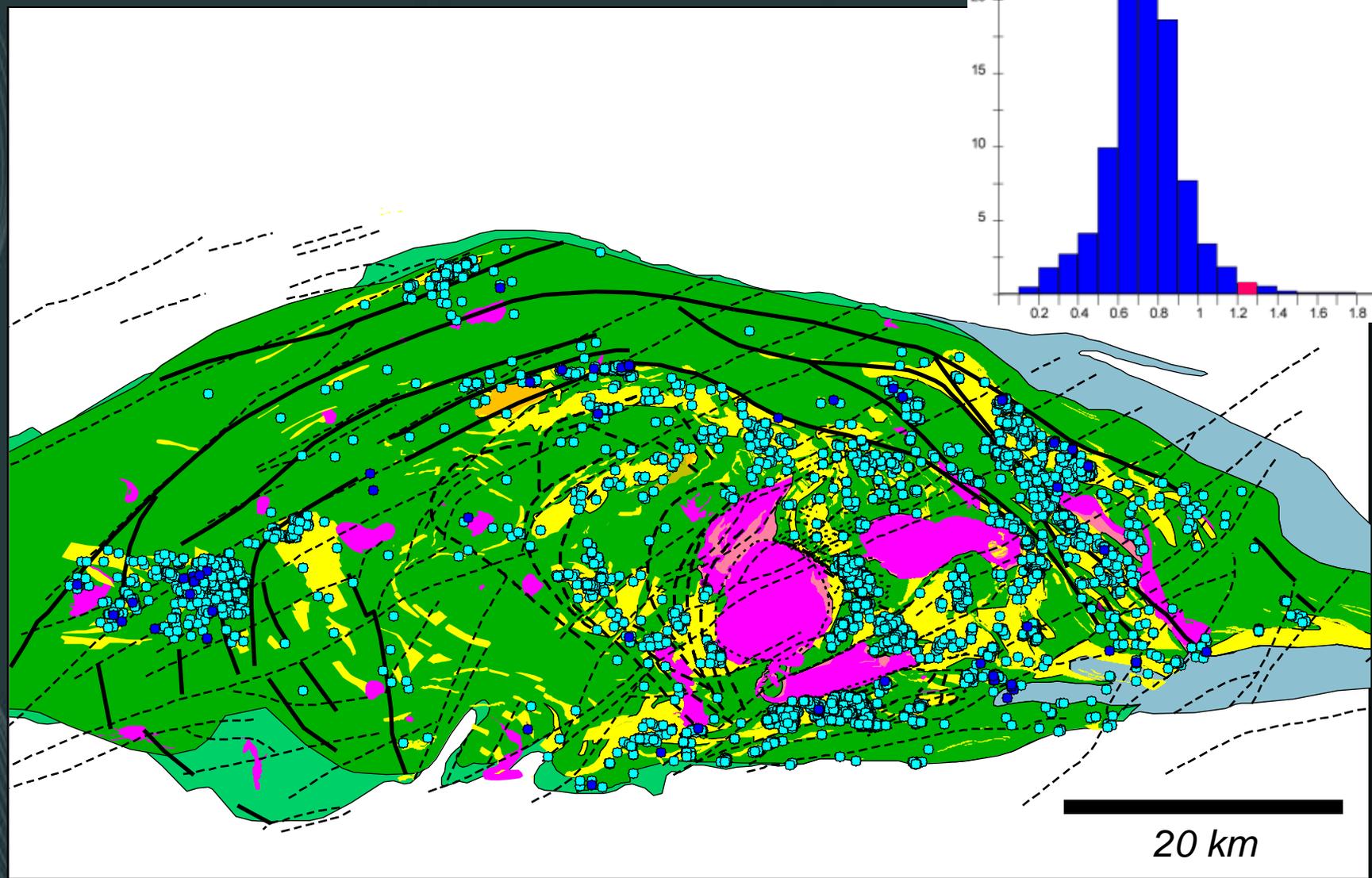
Rhyolites PER-GH: > 1.4



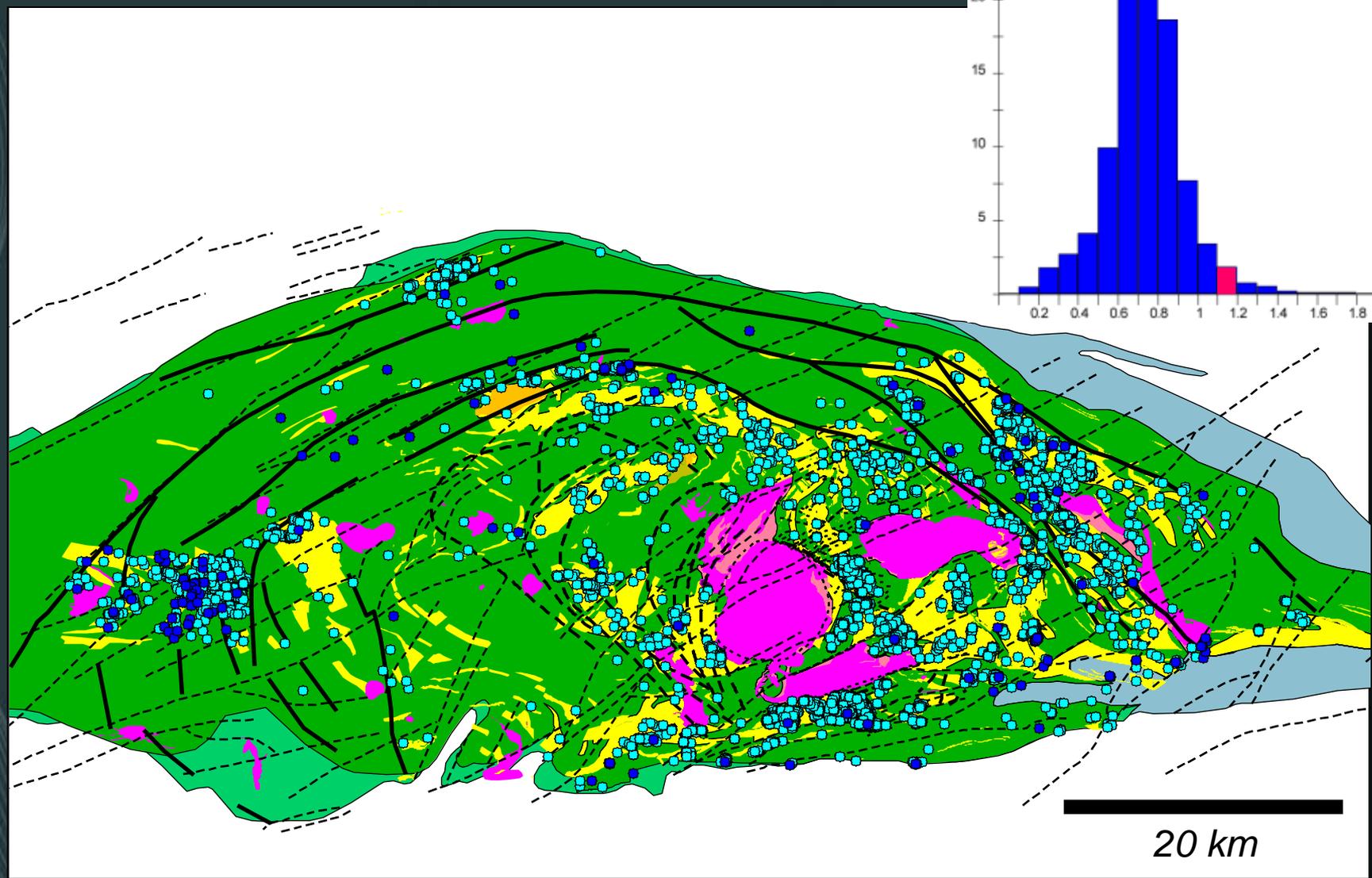
Rhyolites PER-GH: 1.3 - 1.4



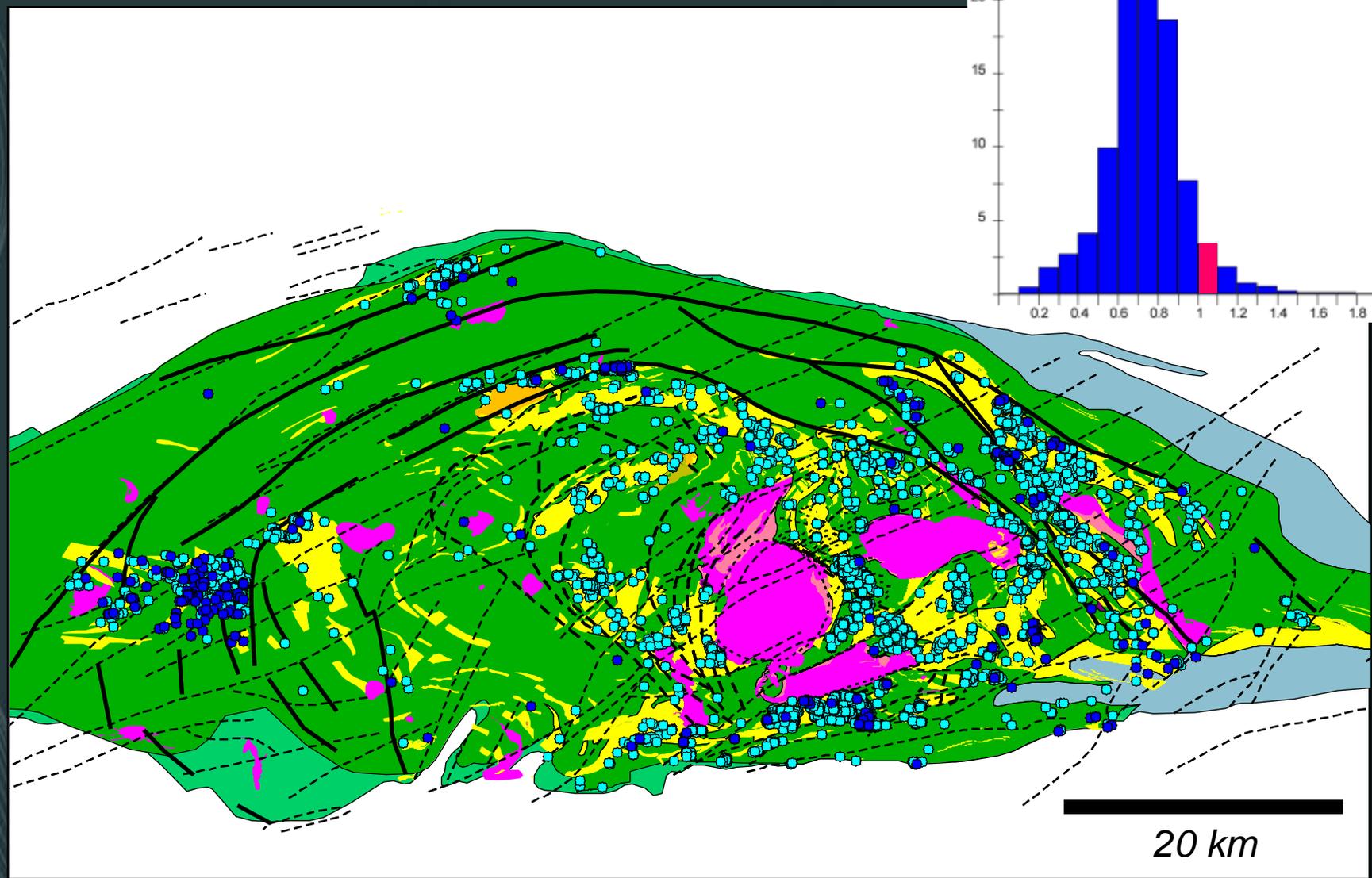
Rhyolites PER-GH: 1.2 - 1.3



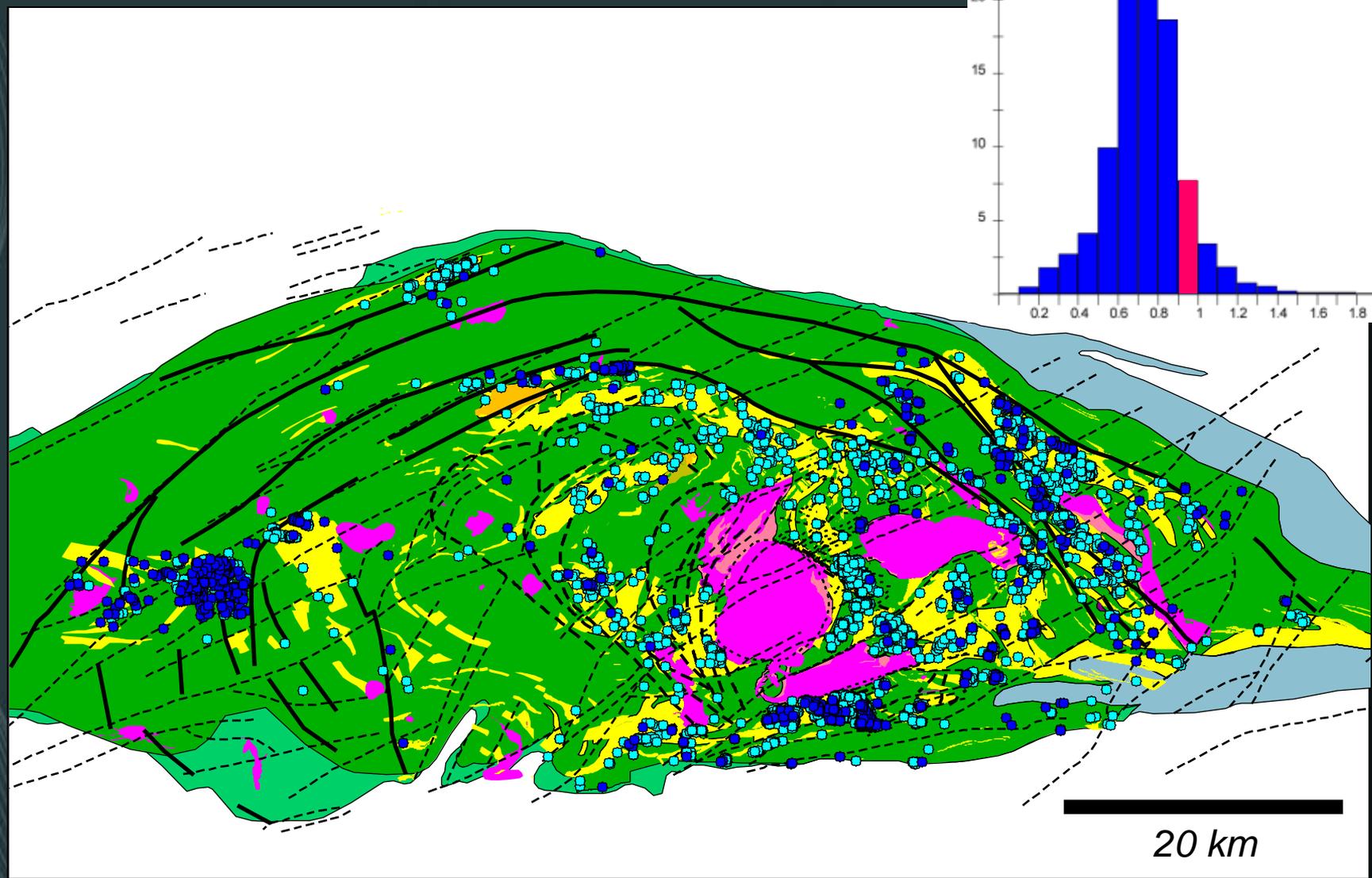
Rhyolites PER-GH: 1.1 - 1.2



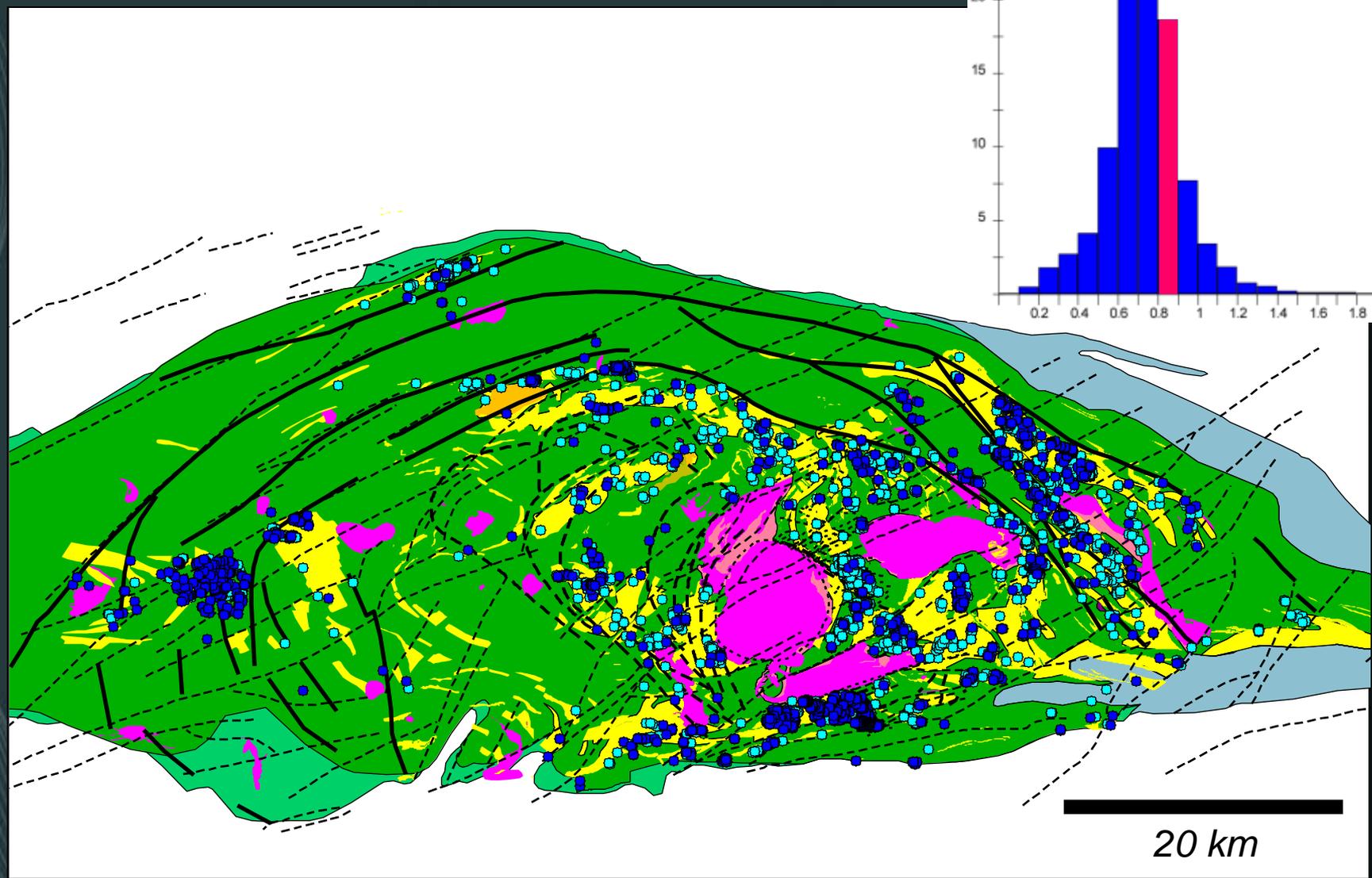
Rhyolites PER-GH: 1.0 - 1.1



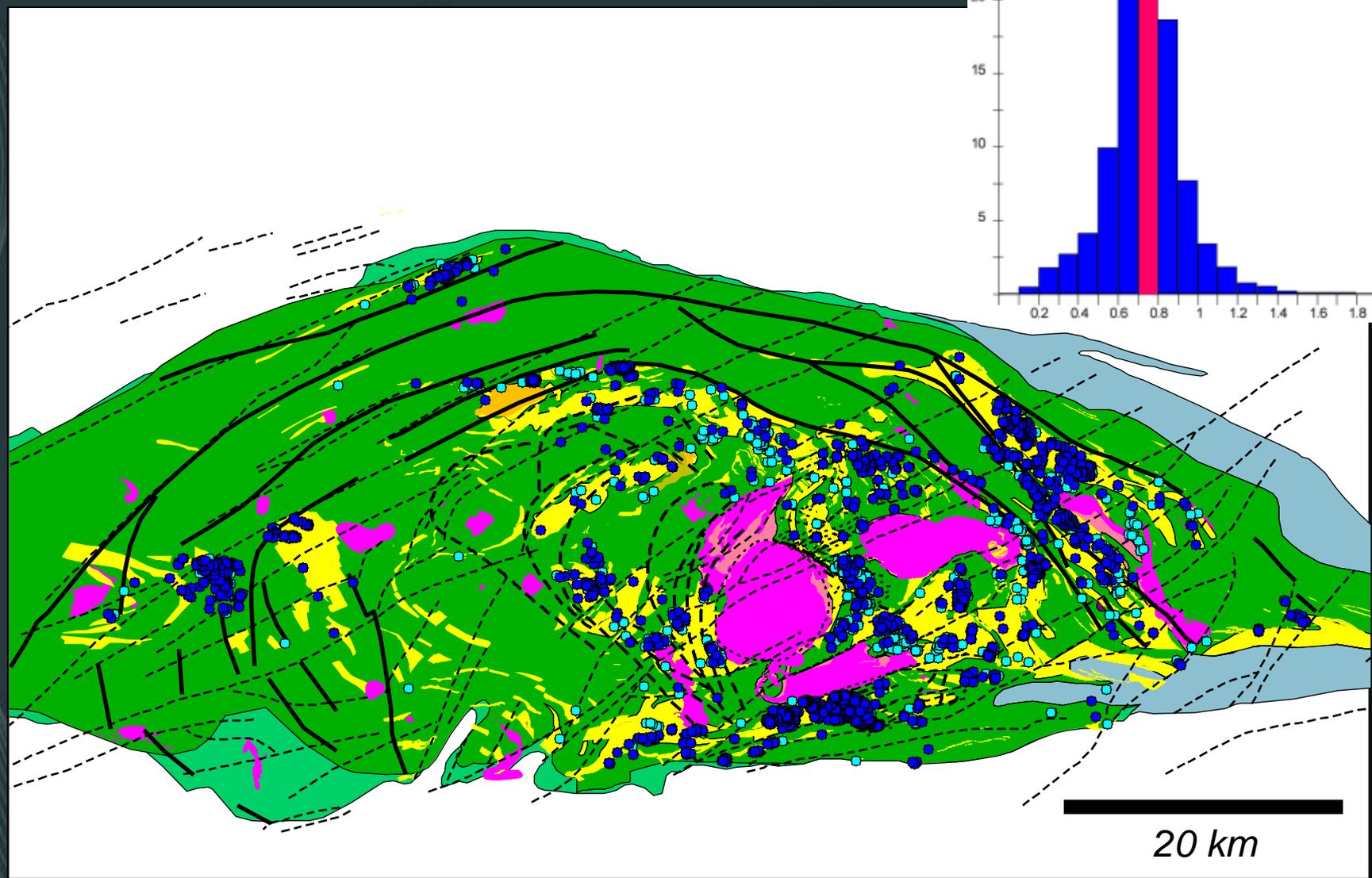
Rhyolites PER-GH: 0.9 - 1.0



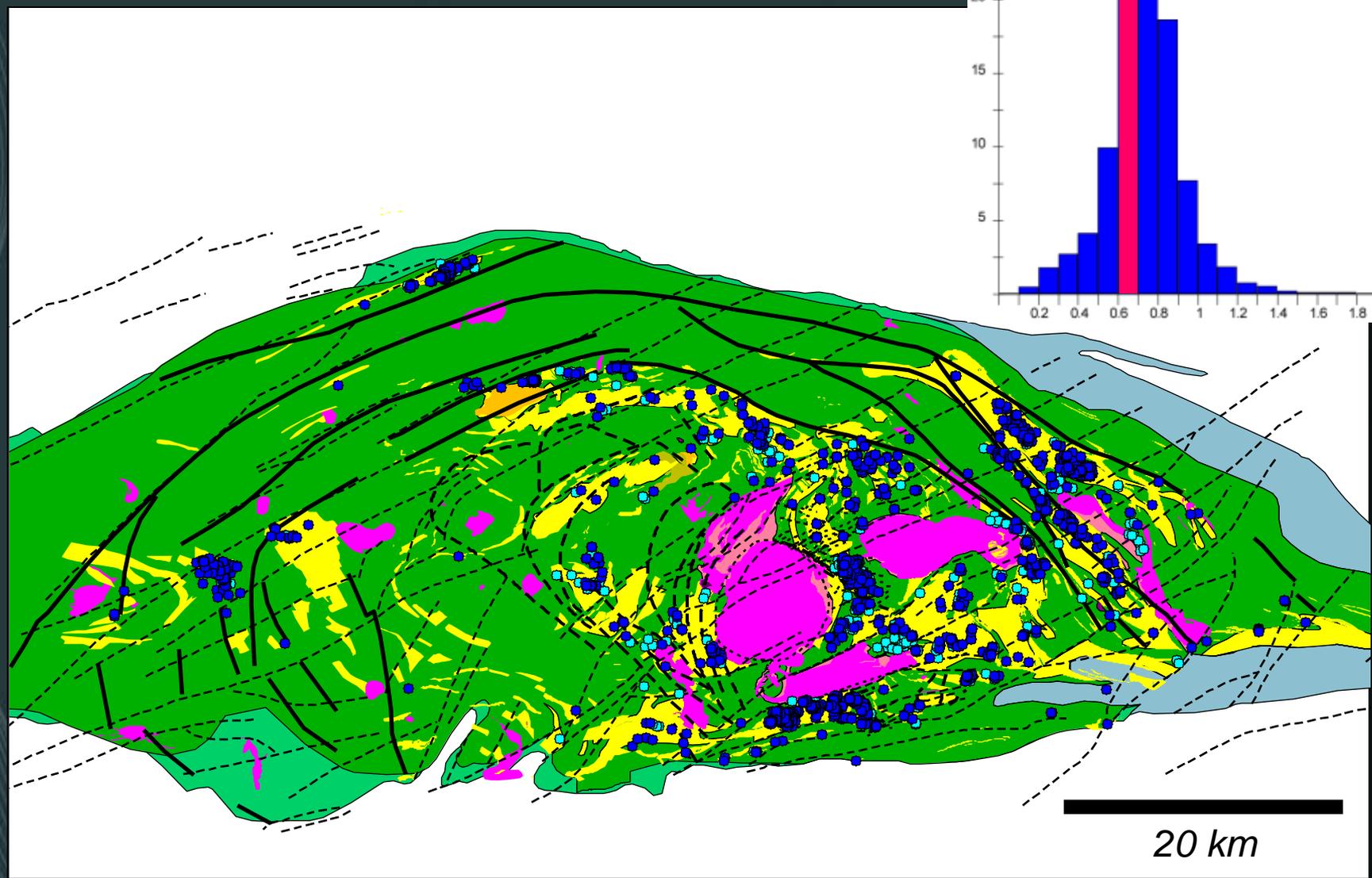
Rhyolites PER-GH: 0.8 – 0.9



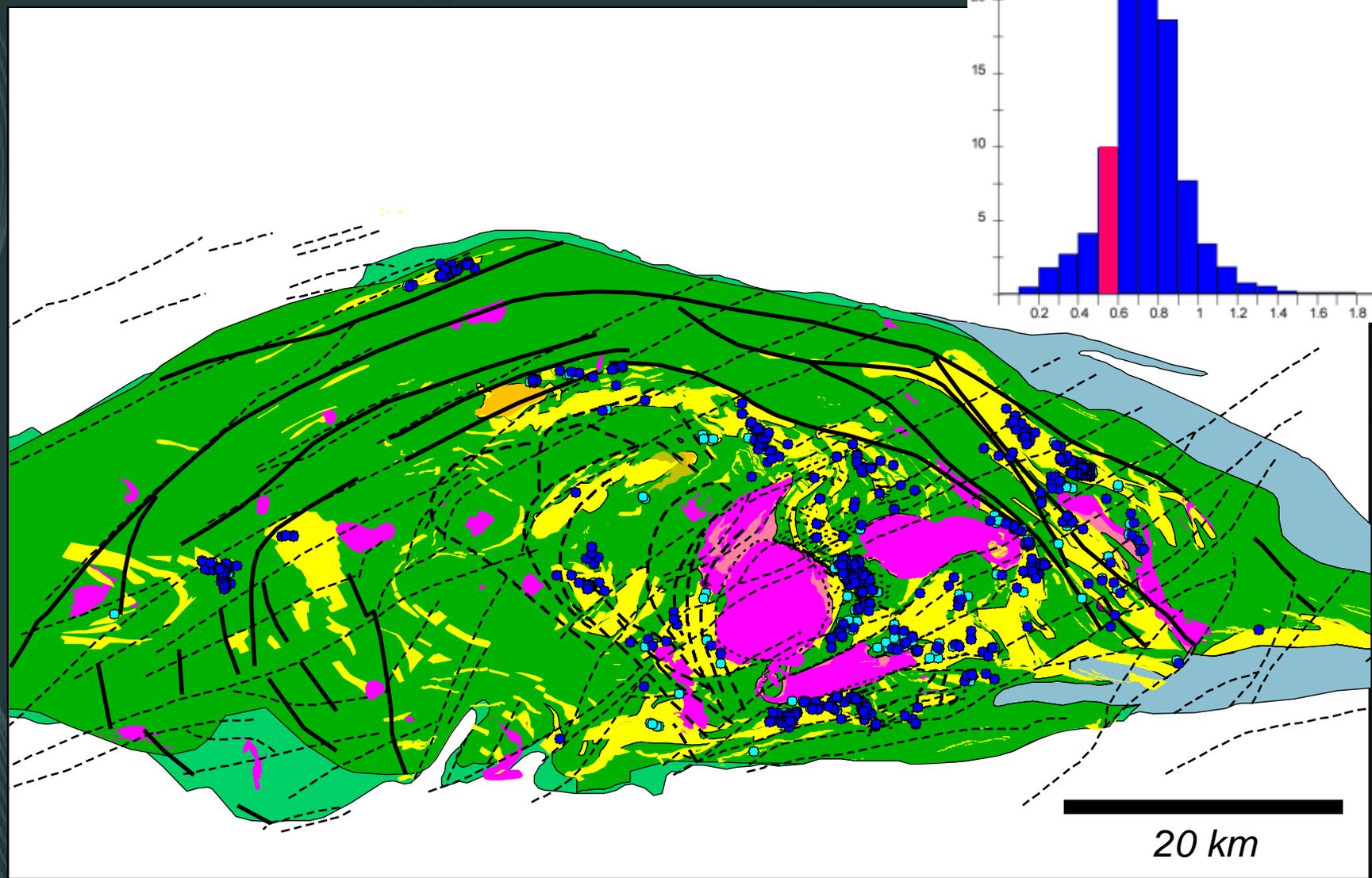
Rhyolites PER-GH: 0.7 – 0.8



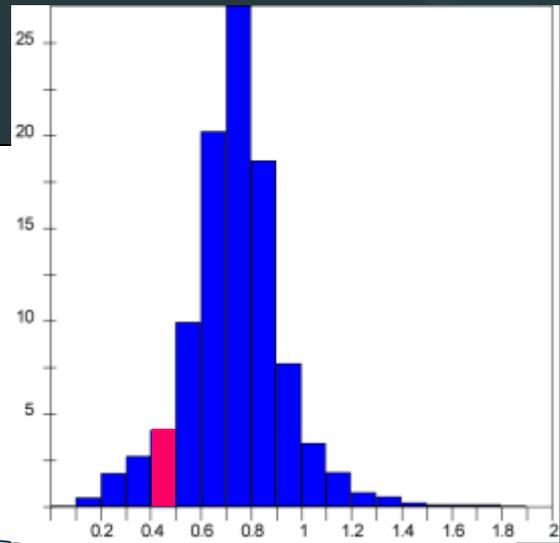
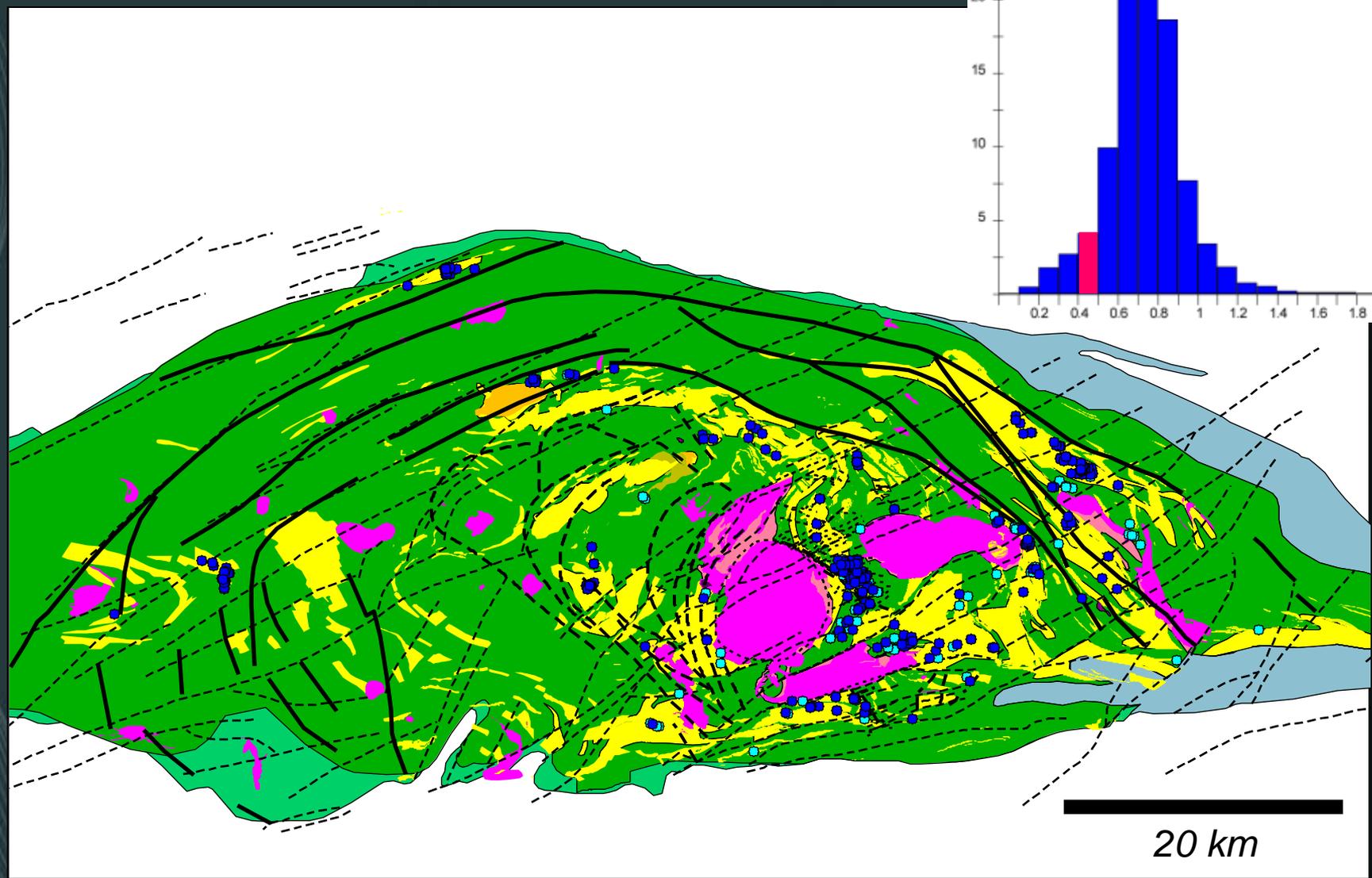
Rhyolites PER-GH: 0.6 – 0.7



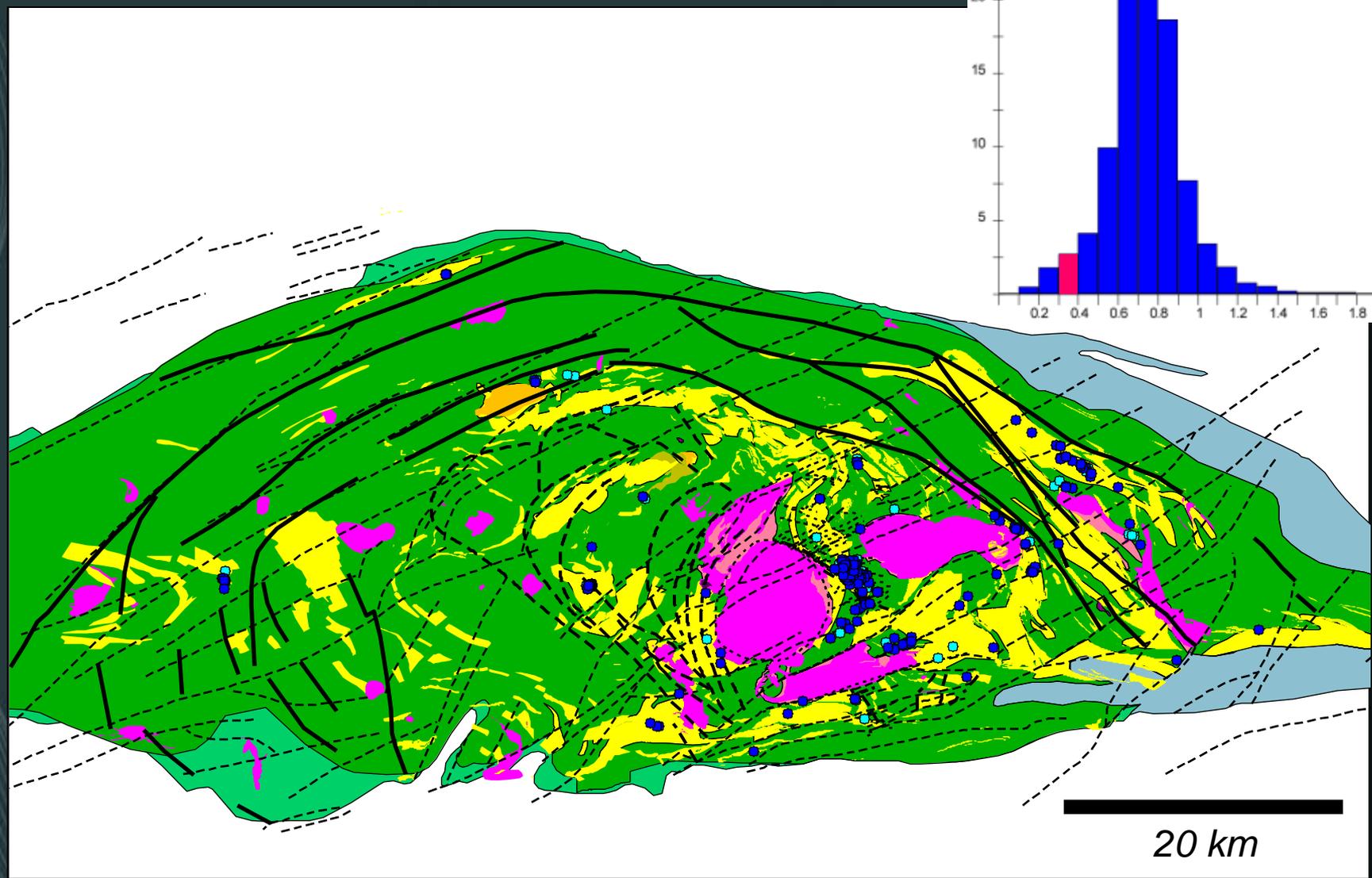
Rhyolites PER-GH: 0.5 – 0.6



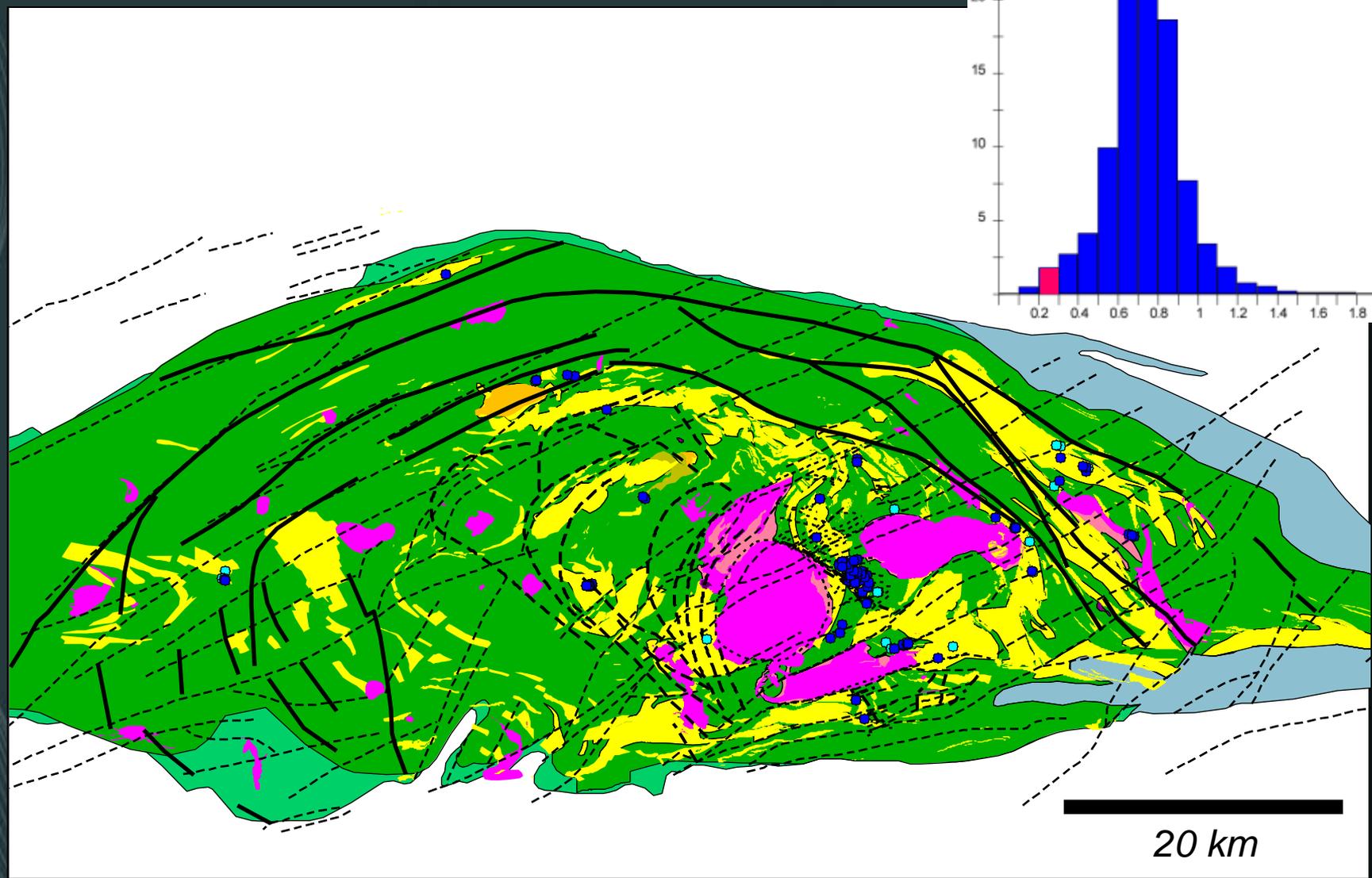
Rhyolites PER-GH: 0.4 – 0.5



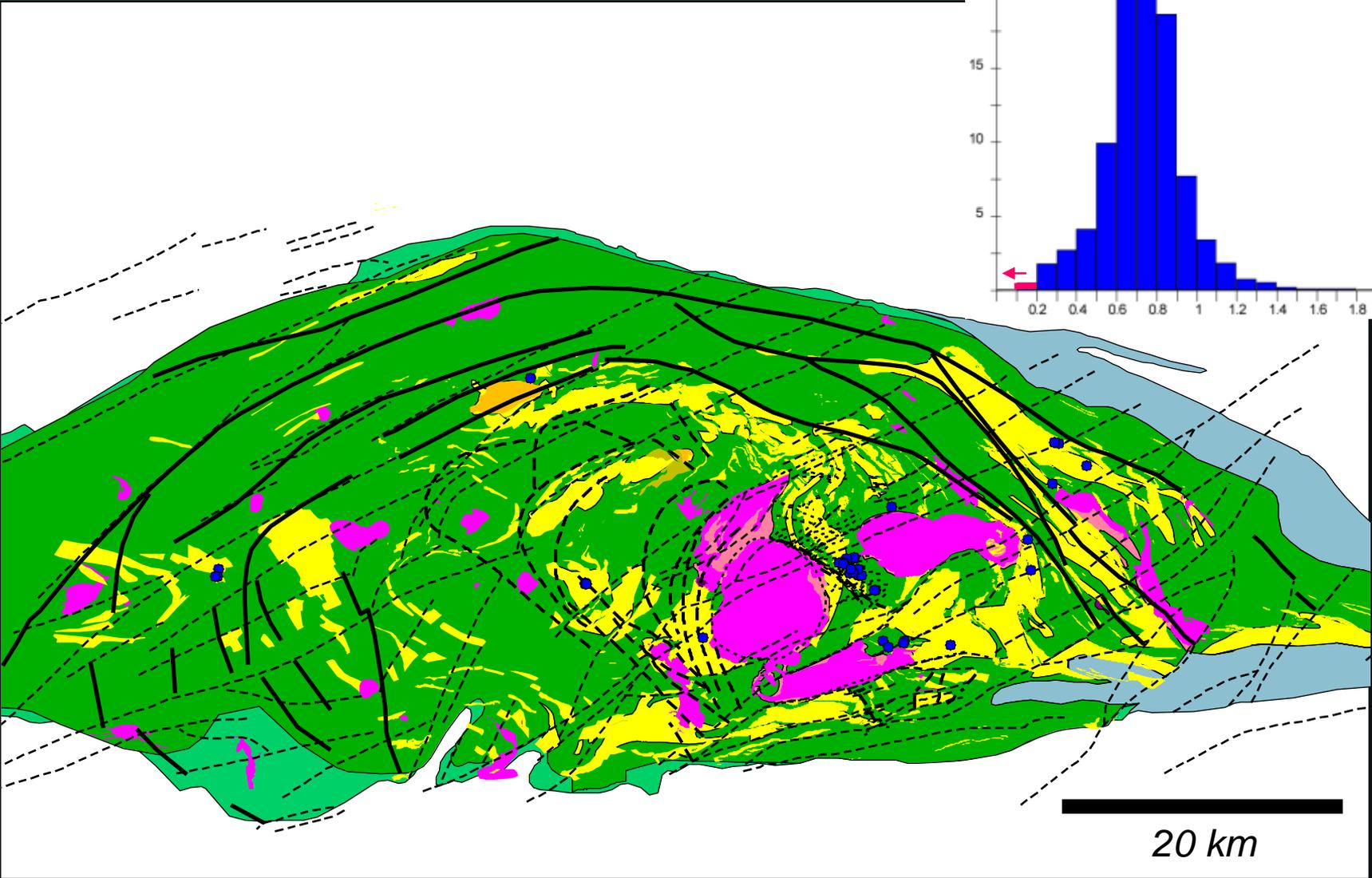
Rhyolites PER-GH: 0.3 – 0.4



Rhyolites PER-GH: 0.2 – 0.3

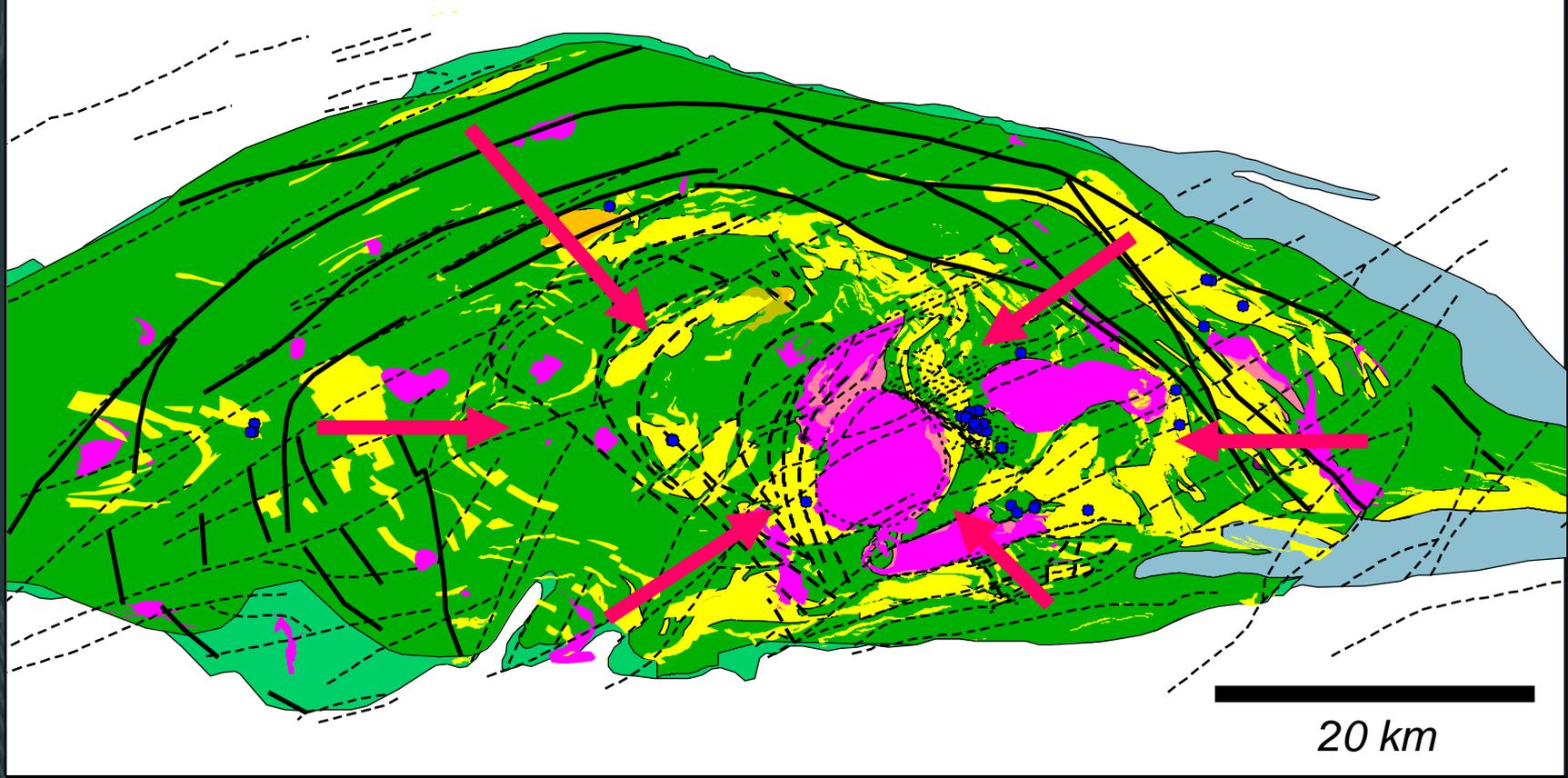


Rhyolites PER-GH: < 0.2



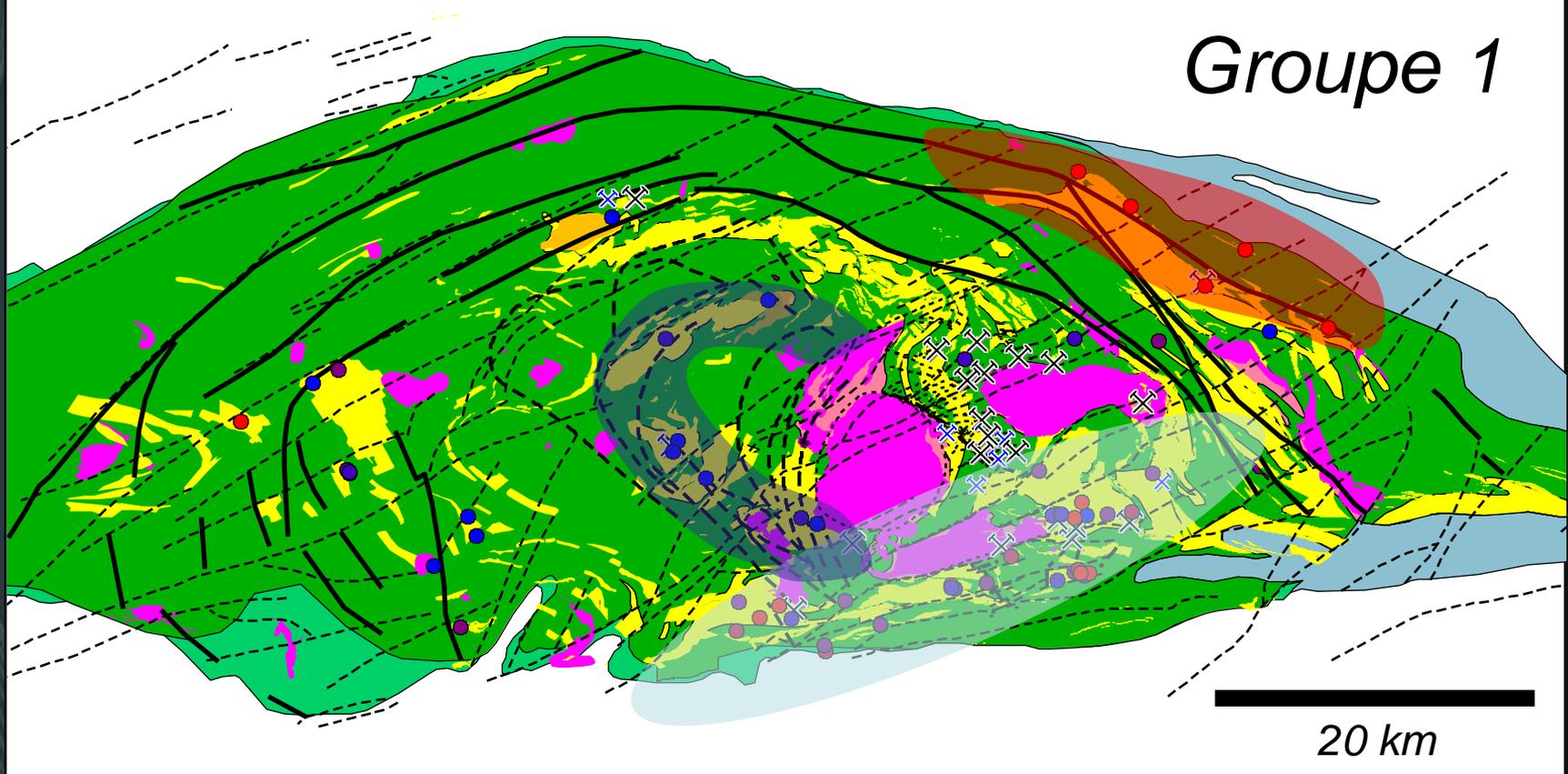
PER-GH: décroissance vers le centre

Implication: Remontée vers le centre du BR des sources magmatiques
Valide le modèle des caldeiras multiples séquentielles



Cohérent avec la chimie des traces

- *La/Yb faible -> moins fractionné: profondeur source plus faible*
- ↓
- *La/Yb fort -> plus fractionné : profondeur source plus grande*



Implication: distribution cohérente avec les structures de caldérias

Implication pour le potentiel SMV

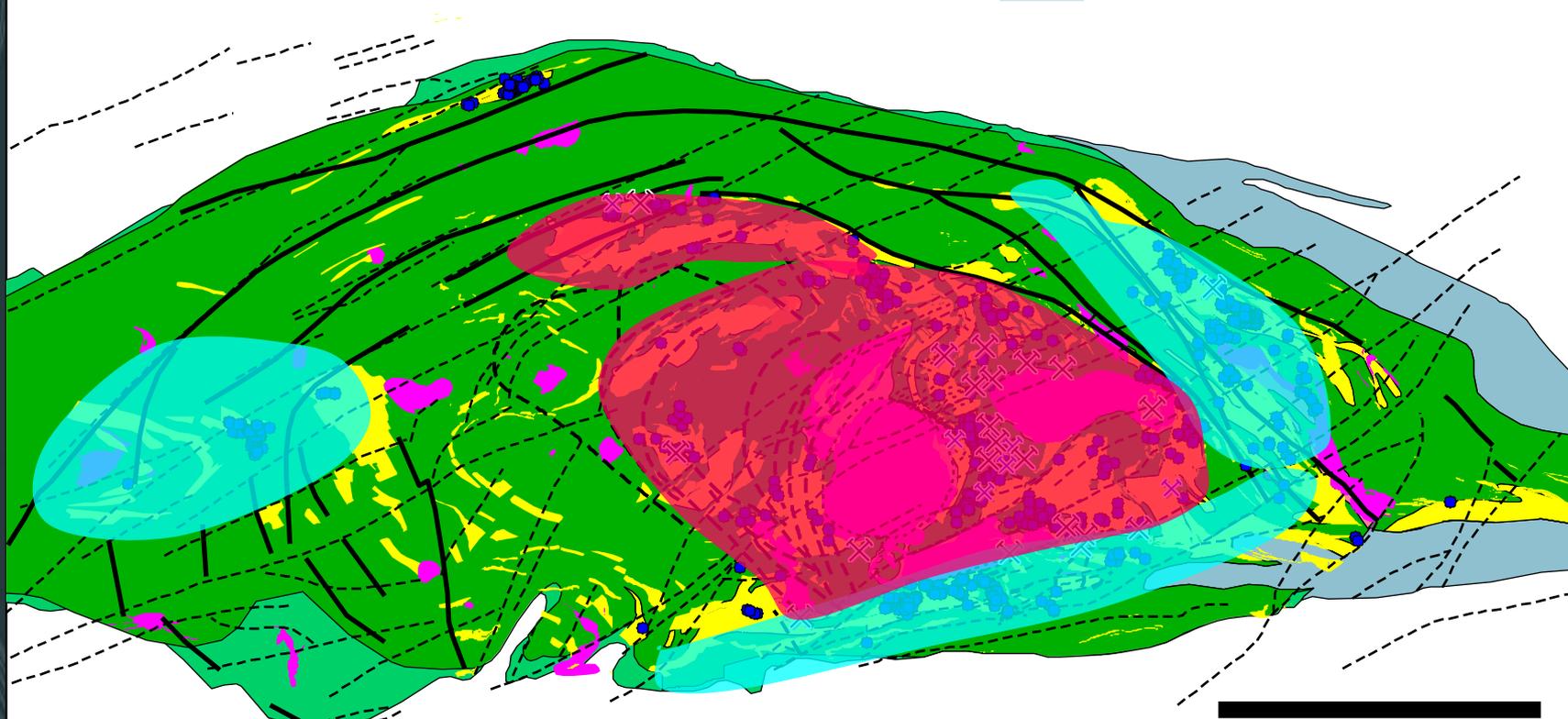
PER-GH: 0.2 - 0.6



Potentiel élevé



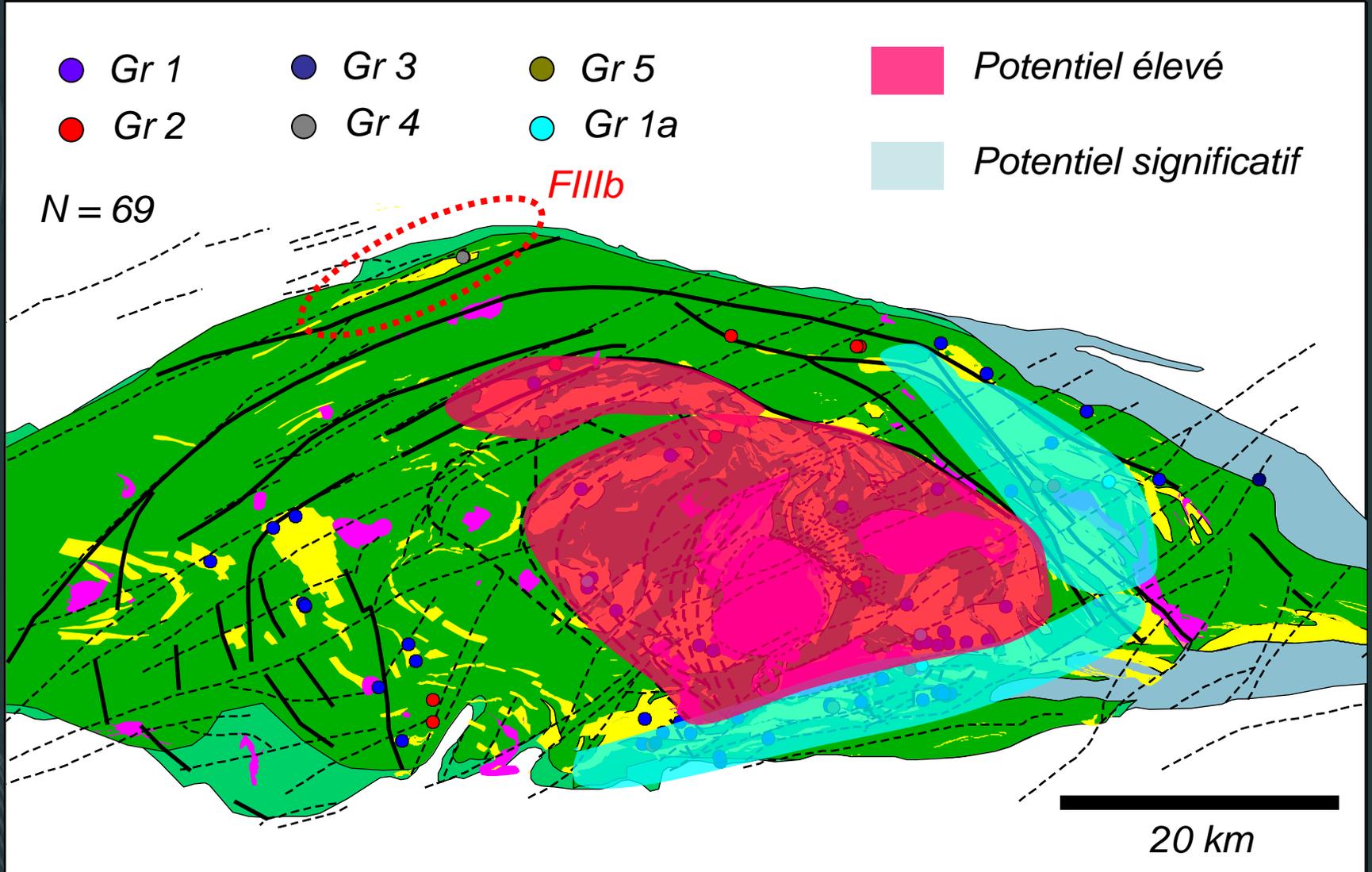
Potentiel significatif



20 km

Distribution des rhyolites en fonction PER-GH: NOREX

Implication pour le potentiel SMV



Distribution des groupes de rhyolites: CONSOREM

Conclusion

- Large chambre magmatique: Misema
- Rhyolites issues magma plus profond: Misema
- Rhyolites issues magma moins profond: New-Senator et Noranda
- Potentiel SMV: associé aux rhyolites issues magma moins profond
- Flux thermique élevé, meilleure préservation, événement tardif
- Misema: potentiel SMV mais réutilisation fractures par magmatisme
- Validation du modèle Pearson
- Démonstration du potentiel du PER-GH