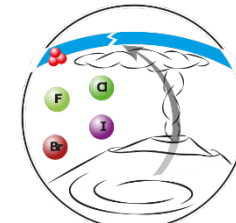
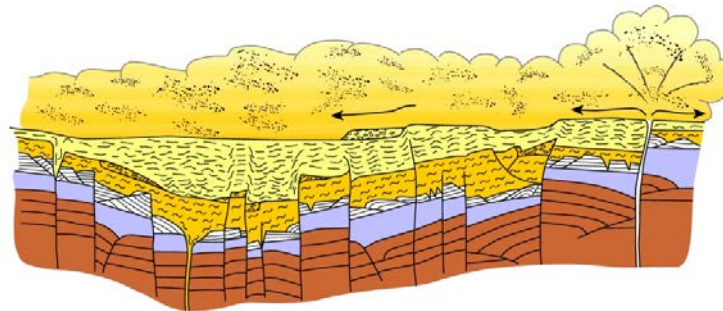
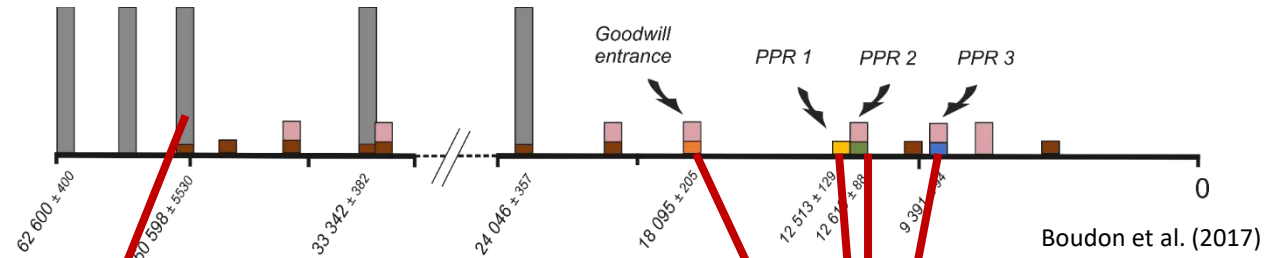
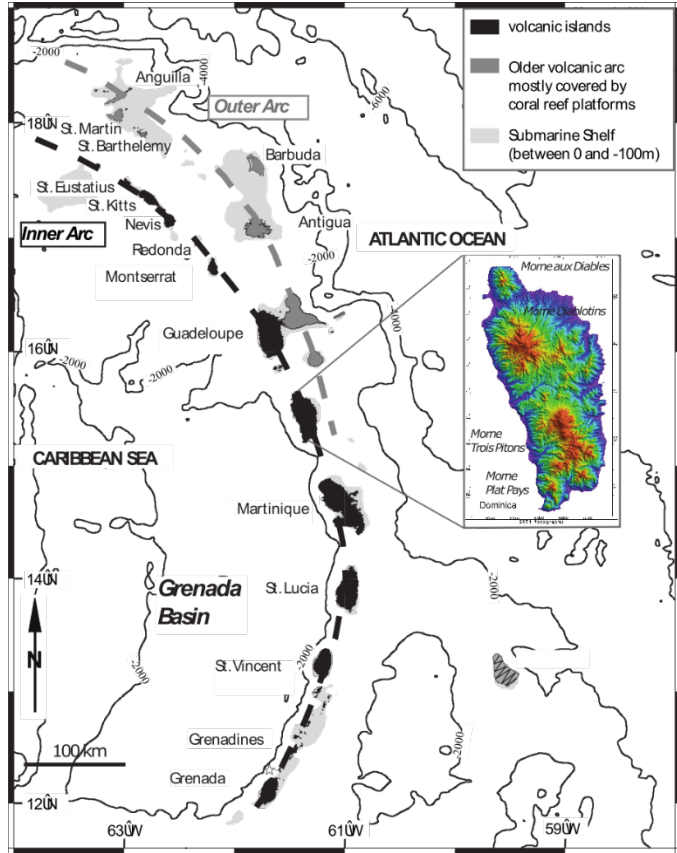


Dominica: transcrustal magmatic system and eruptive halogen budgets

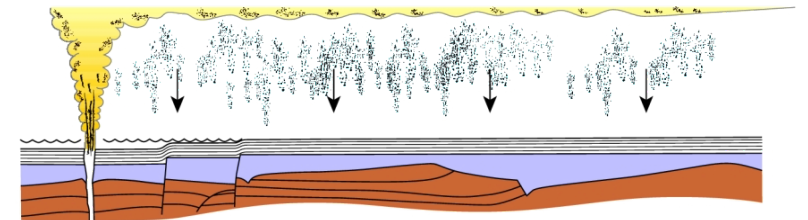
T. d'Augustin, H. Balcone-Boissard, G. Boudon, C. Martel, E. Deloule, P. Bürckel

Under review (minor revisions) in *Geochemistry, Geophysics, Geosystems*

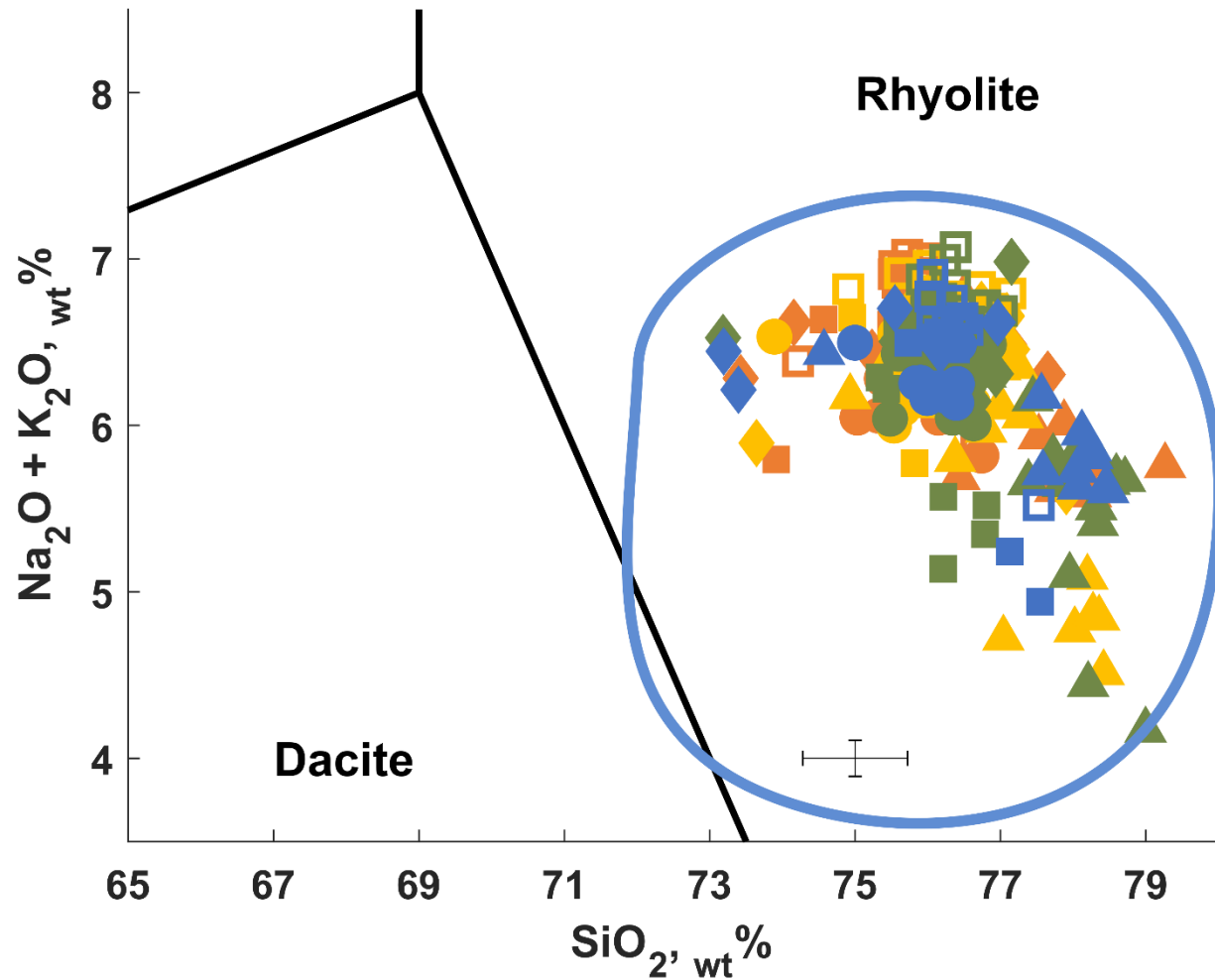
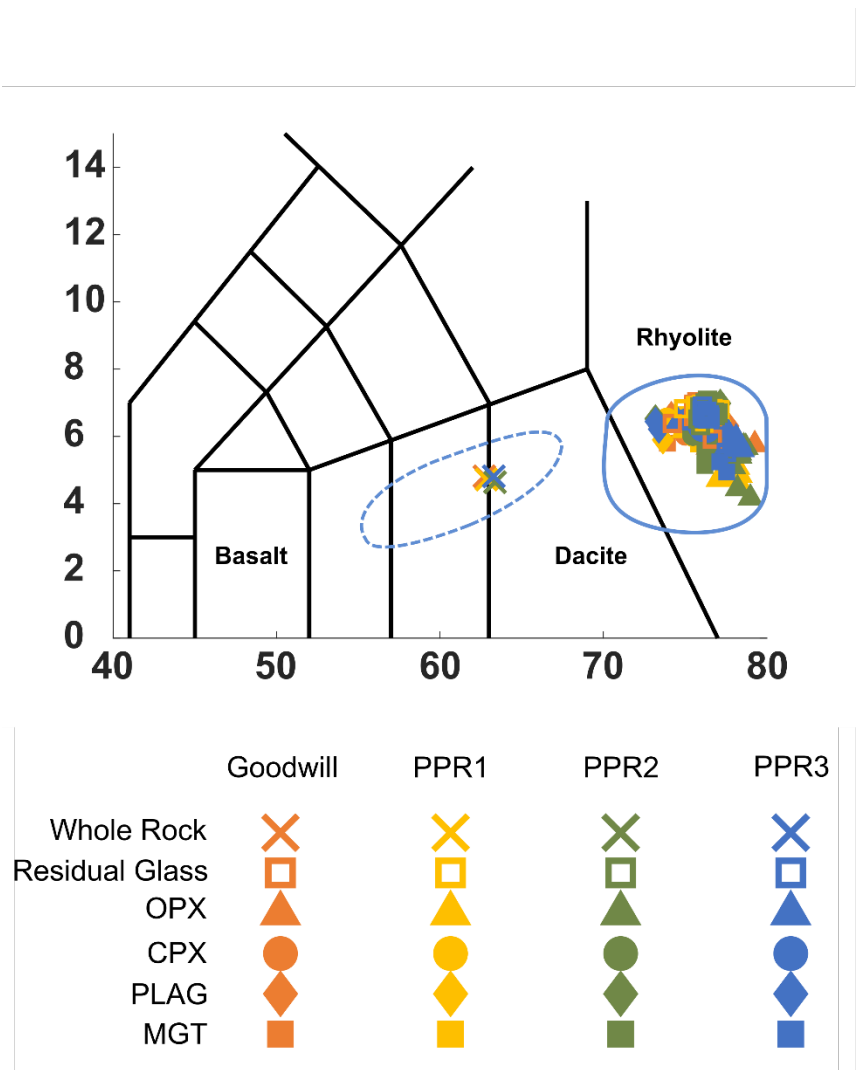




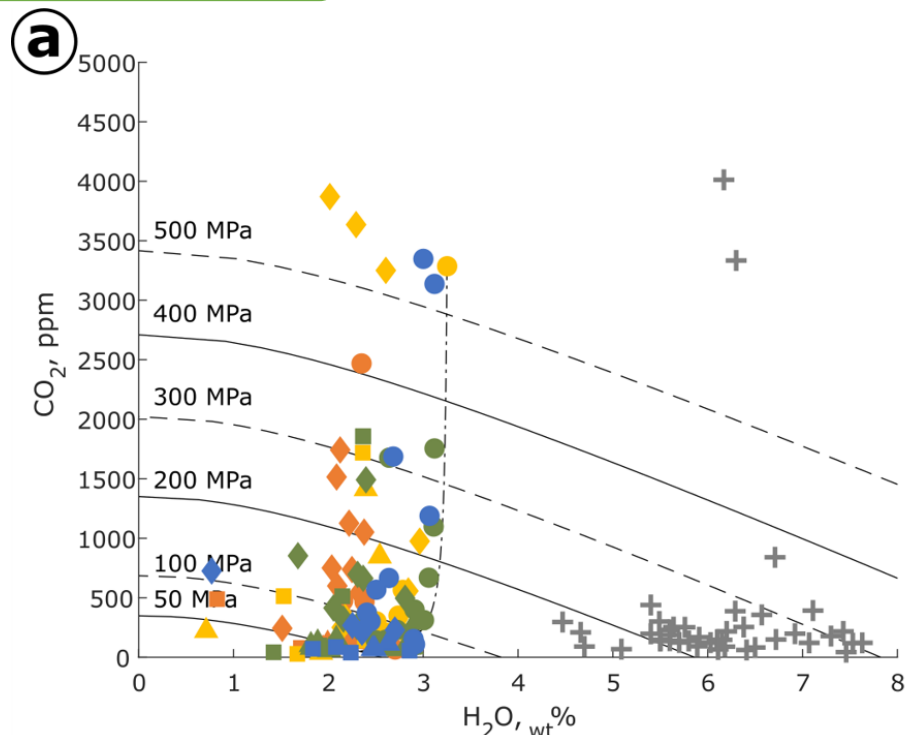
Ignimbrites (Balcone-Boissard et al. 2018)



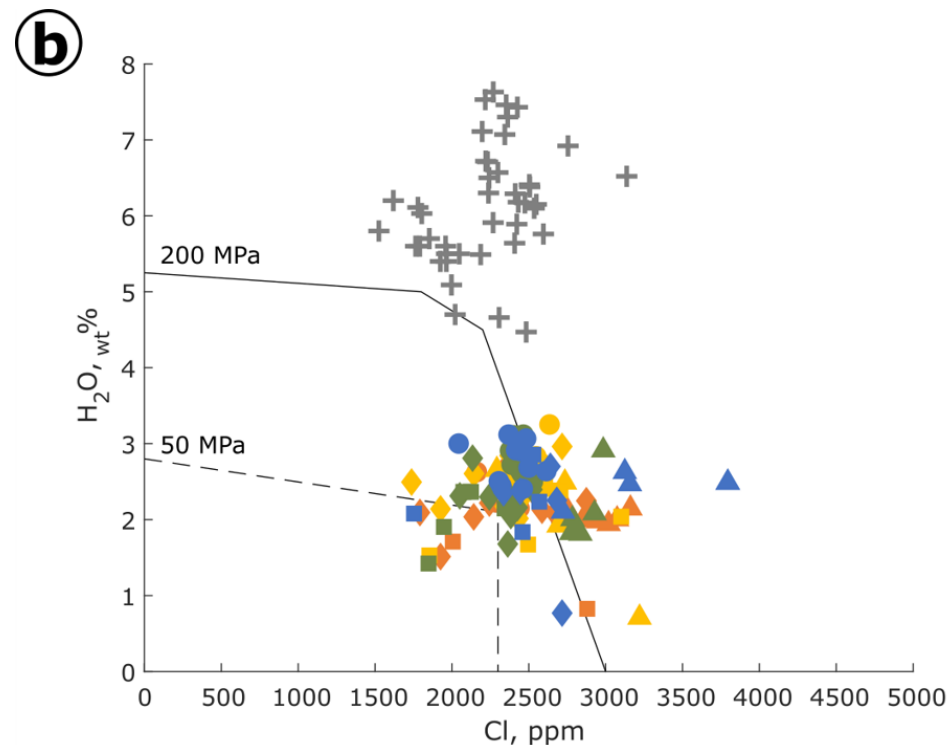
Plinian eruptions (this study)



Blue circles correspond to ignimbrites from Balcone-Boissard et al. (2018)



Gery crosses : ignimbrites from Balcone-Boissard et al. (2018)



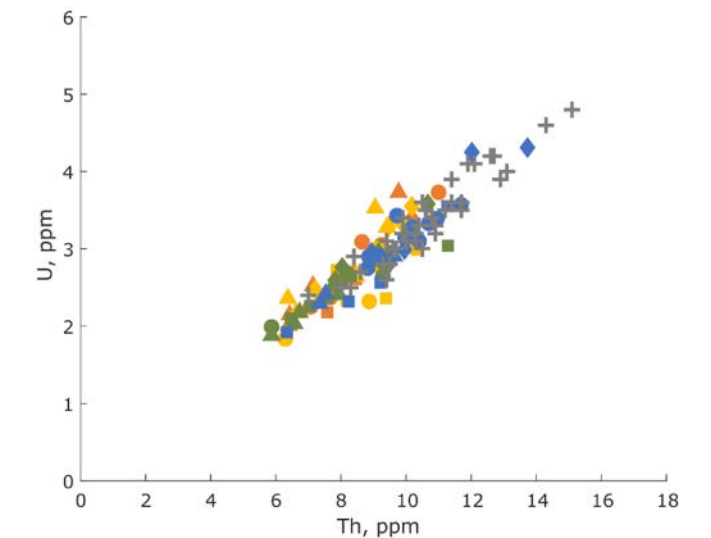
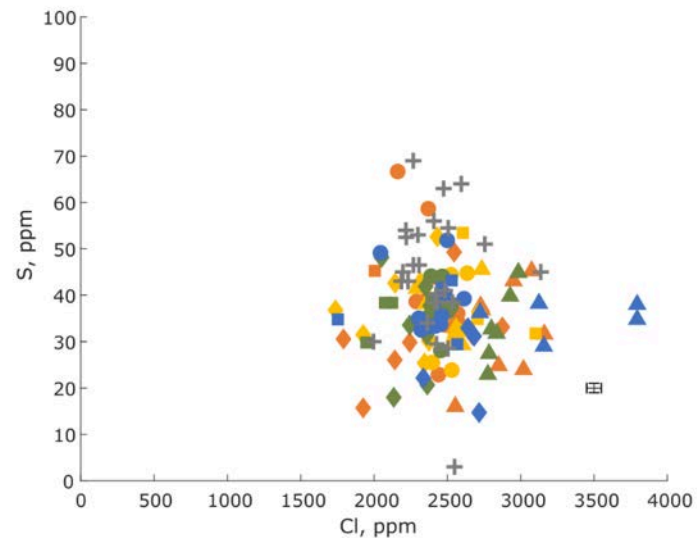
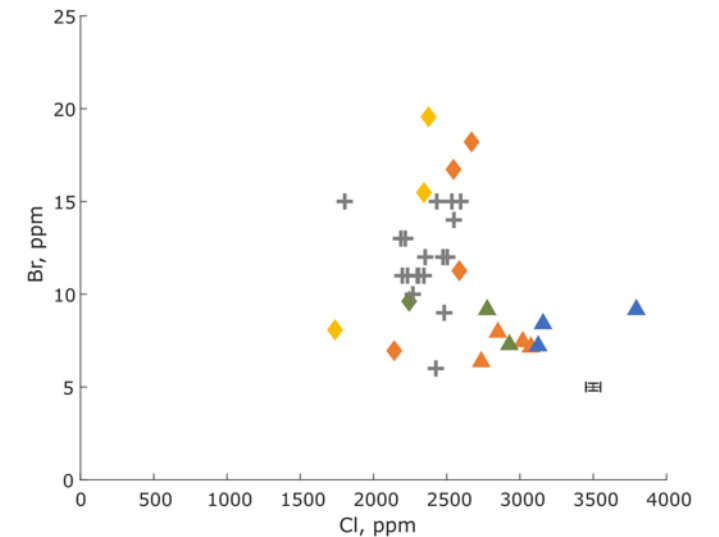
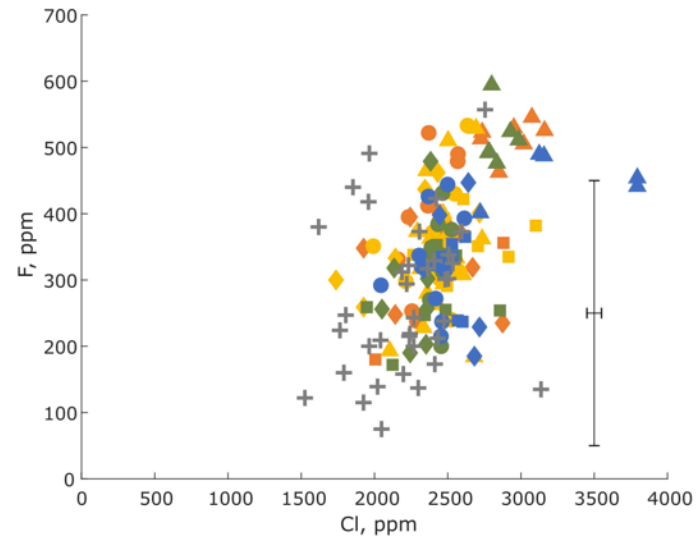
Gery crosses : ignimbrites from Balcone-Boissard et al. (2018)

- MagmaSat : most of inclusions : 50 – 150 MPa
- VolatileCalc :
 - Most of inclusions : 50-200 MPa
 - Degassing path (closed system, 0-1% exsol)

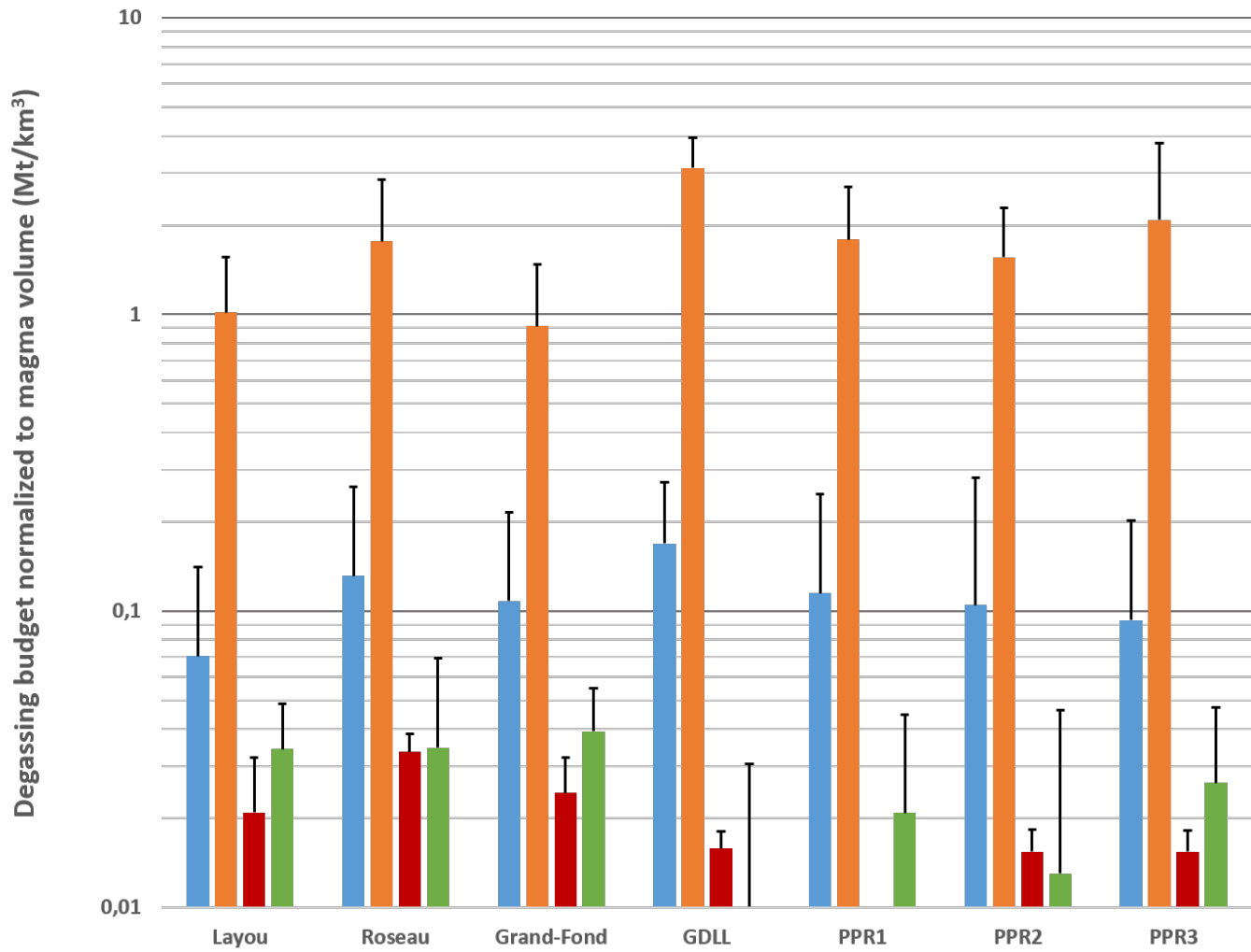
- Cl-H₂O (isobares Webster, 1997) :
 - Less precise than H₂O-CO₂
 - Consistent results

- Storage pressures :
 - Phase equilibrium requires pressures lower than 200 MPa (≤ 7.1 km deep)
- Storage temperatures :
 - 860 – 890°C based on OPX-CPX, OPX-melt and CPX-melt equilibrium (Putirka 2008)
 - PLAG-melt and MGT-melt thermometer unreliable because of cristallizations histories

- Halogen ratios
 - =f(source)
 - Preserved during degassing
 - Identical for both plinian eruptions and ignimbrites
- Trace element ratios
 - =f(source)
 - Identical for both plinian eruptions and ignimbrites
- Common source of magmas for all eruptions



Gery crosses : ignimbrites from Balcone-Boissard et al. (2018)



- Normalized degassing budgets of each element are the same order of magnitude from an eruption to another
- S degassing is the same order of magnitude as Br
- F degassing is 1 order of magnitude higher than S and Br
- Cl degassing is 2 orders of magnitude higher than S and Br
- Halogen elements must be taken into account as reactive species emitted in volcanic plumes

- Boudon, G., Balcone-Boissard, H., Solaro, C., & Martel, C. (2017). *Revised chronostratigraphy of recurrent ignimbritic eruptions in Dominica (Lesser Antilles arc): Implications on the behavior of the magma plumbing system*. *Journal of Volcanology and Geothermal Research*, 343, 135–154.
- Balcone-Boissard, H., Boudon, G., Blundy, J. D., Martel, C., Brooker, R. A., Deloule, E., et al. (2018). *Deep pre-eruptive storage of silicic magmas feeding Plinian and dome-forming eruptions of central and northern Dominica (Lesser Antilles) inferred from volatile contents of melt inclusions*. *Contributions to Mineralogy and Petrology*, 173(12), 101.