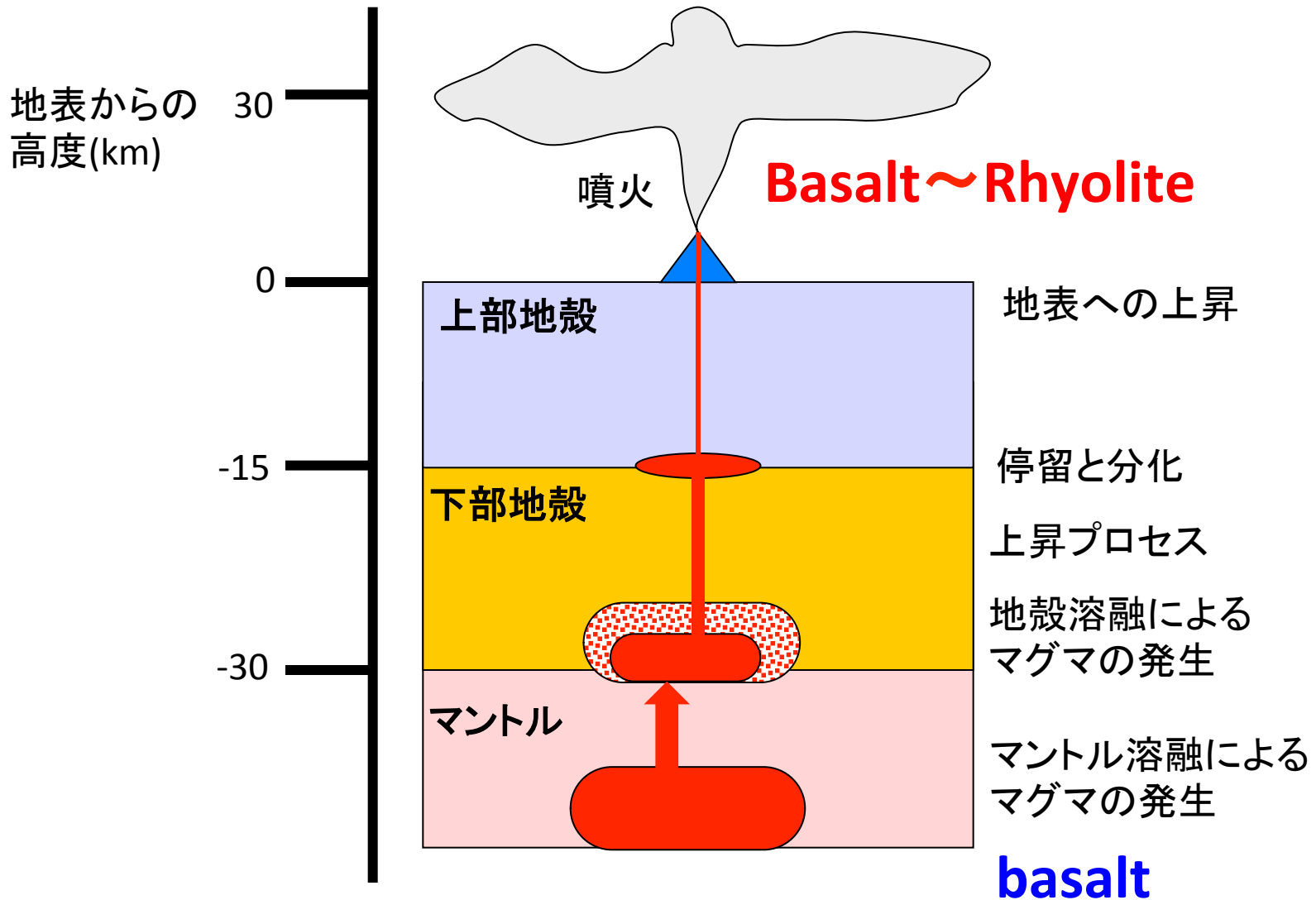


# マグマ溜りにおける 二重拡散対流

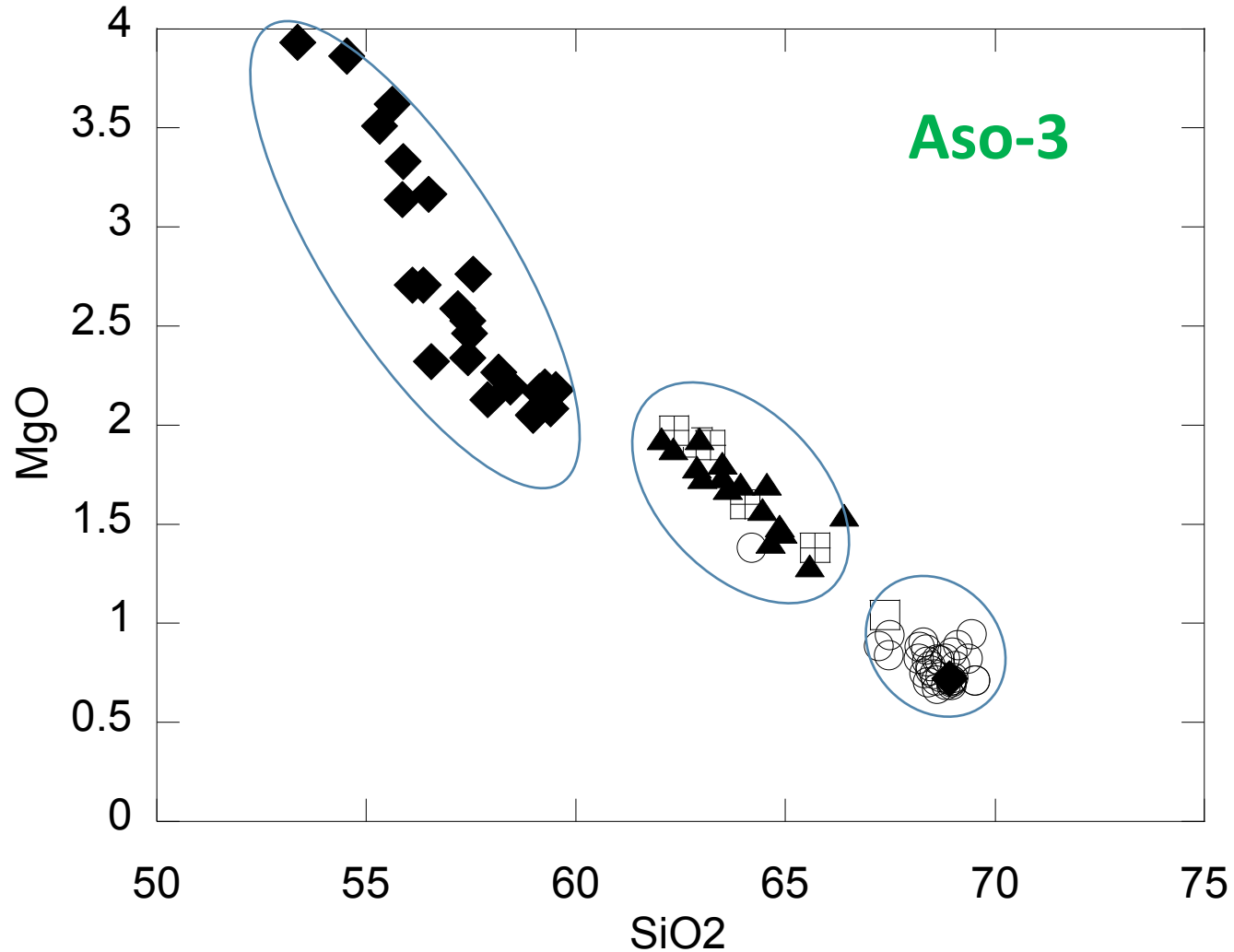
金子 克哉

京都大学 大学院人間・環境学研究科

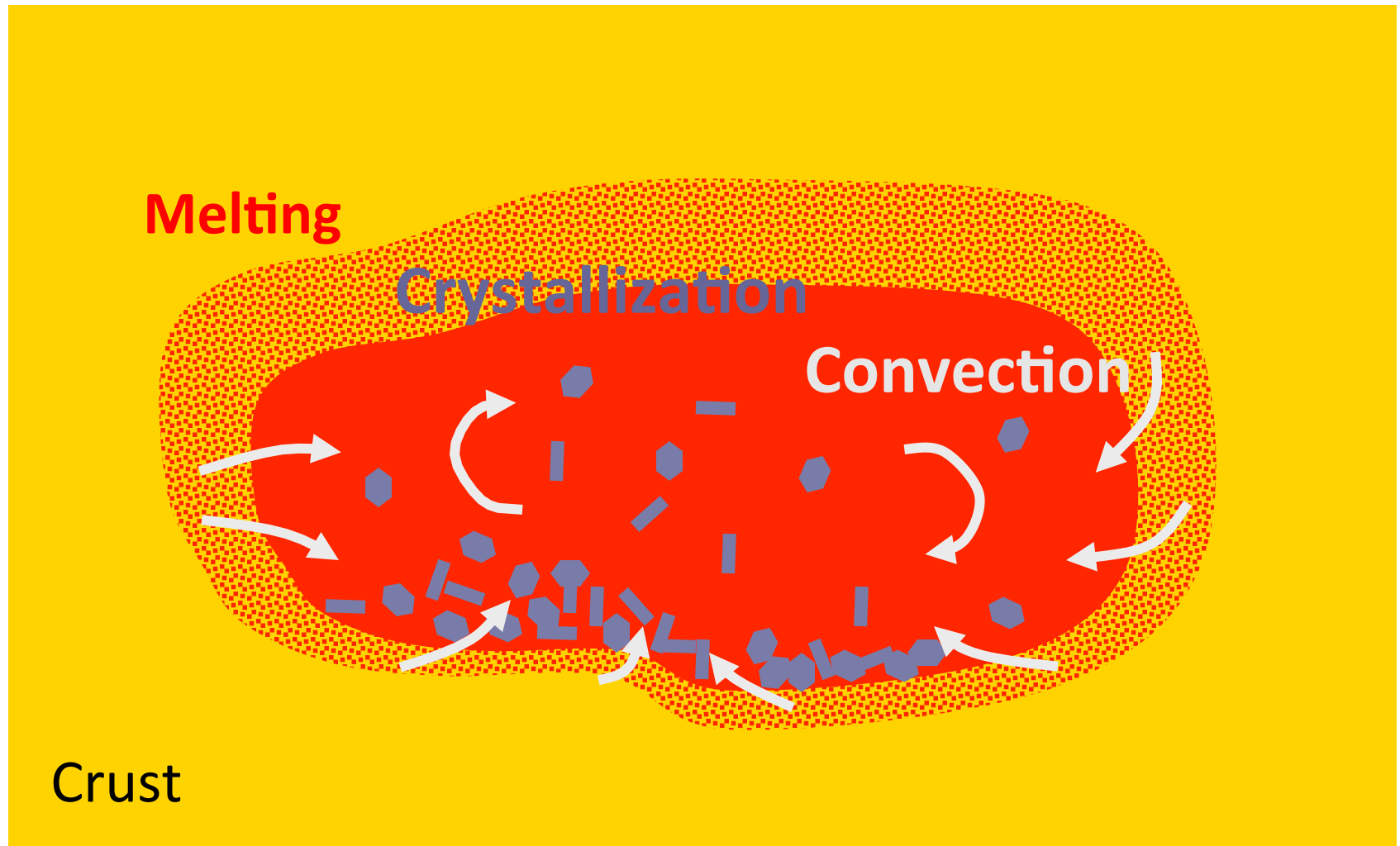
# マグマ発生から火山まで



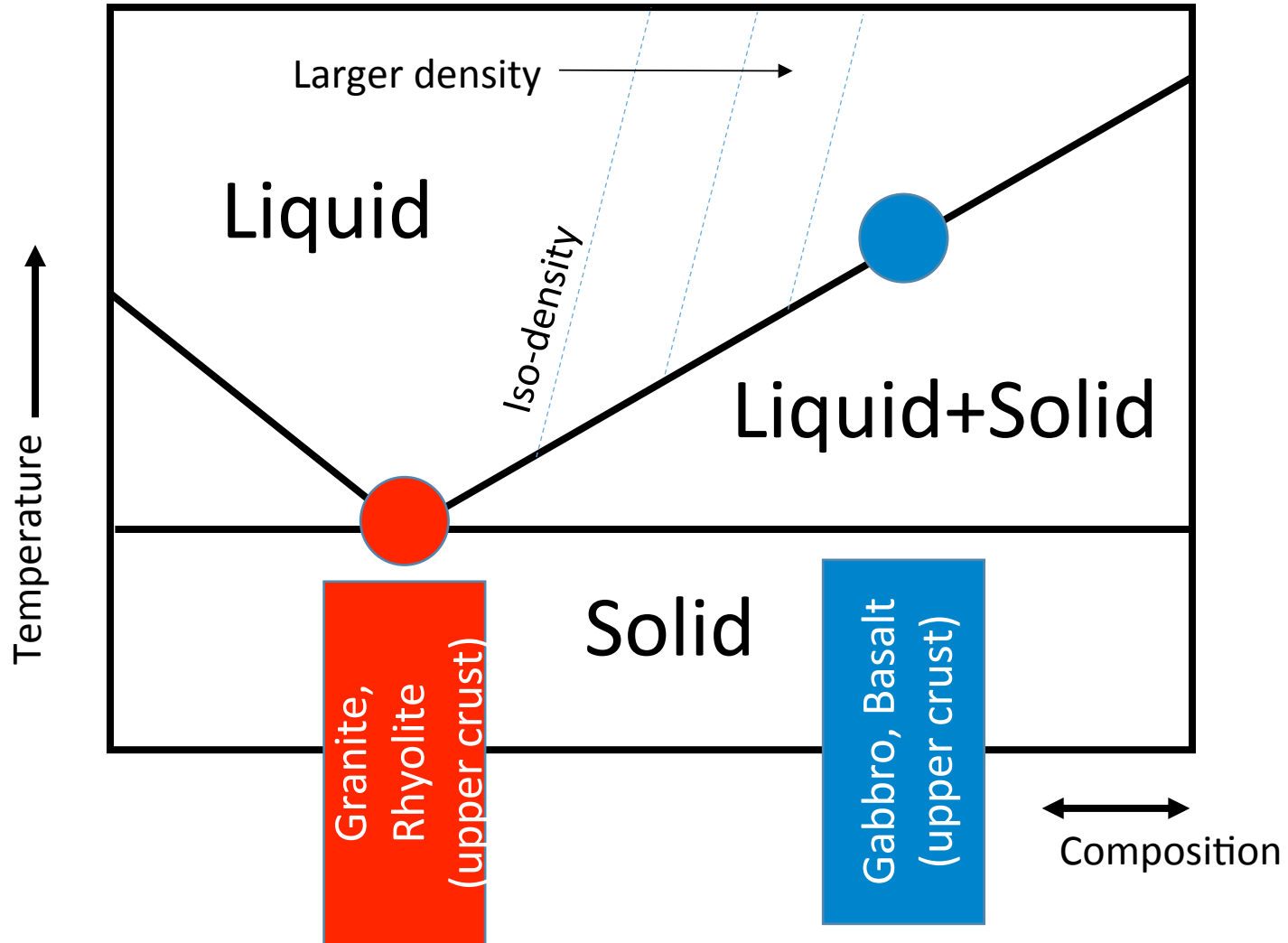
# Whole-rock composition of Aso ejecta



# AFC in magma chamber

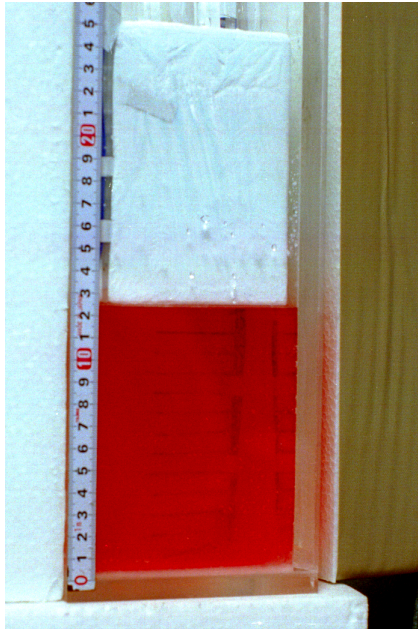


# Schematic phase diagram of magma and crust

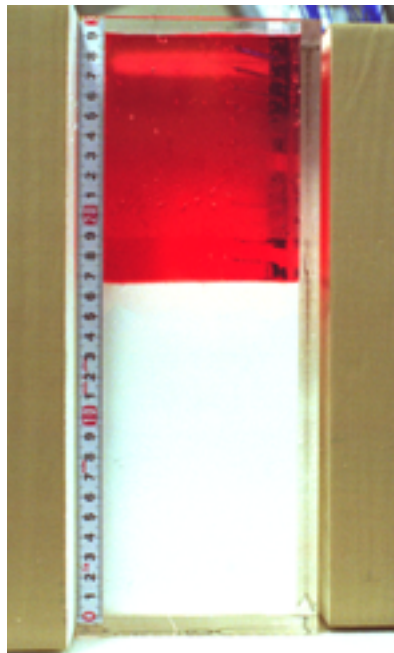


# Photos of experiments (t=0)

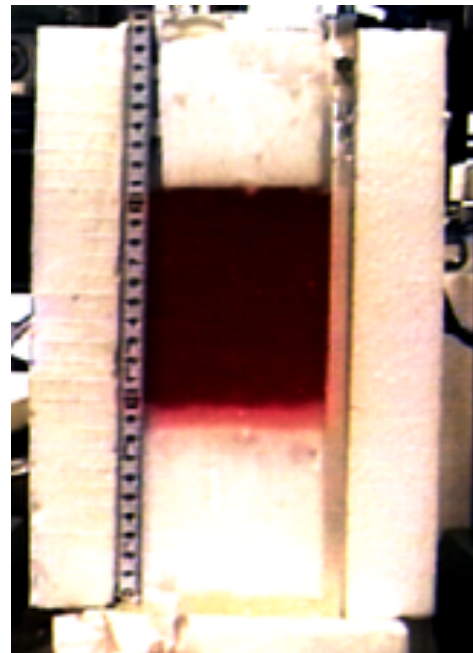
**Roof**



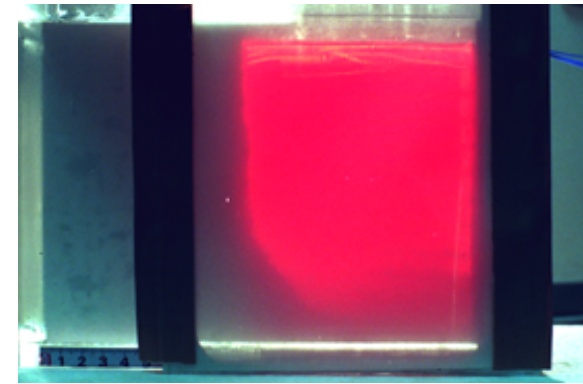
**Floor**



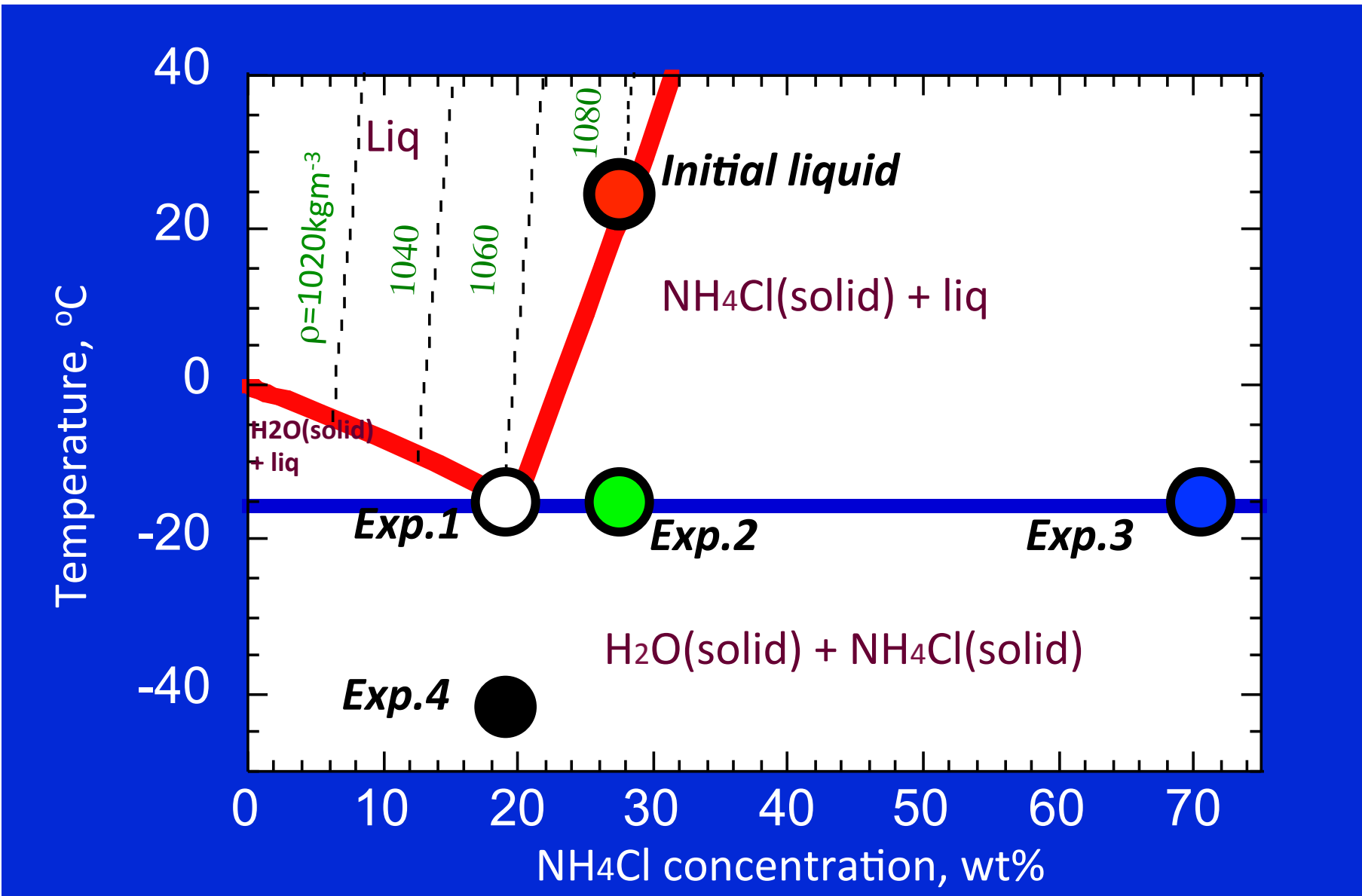
**Roof & Floor**



**Side wall**

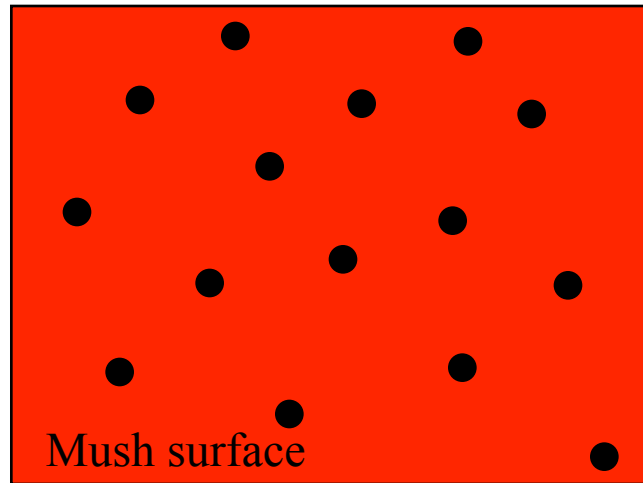


# NH<sub>4</sub>Cl-H<sub>2</sub>O System & Initial Conditions

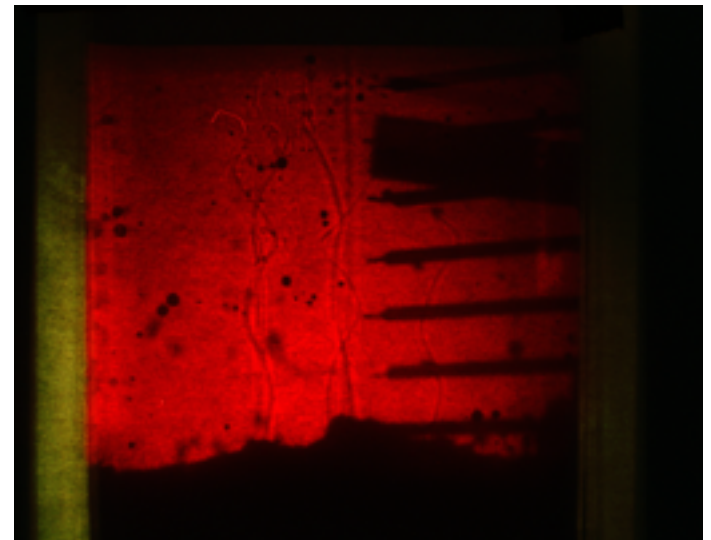
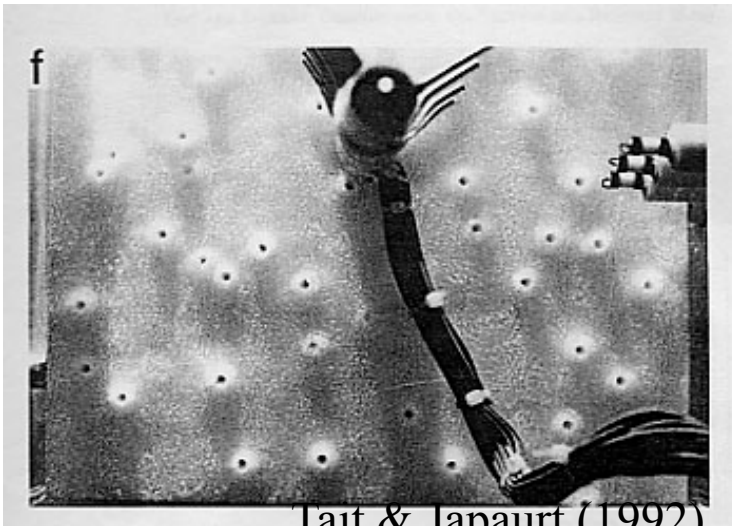
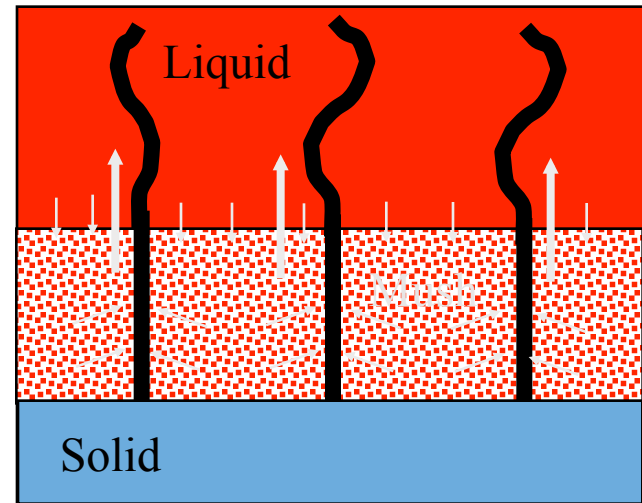


# Chimney

## Top view

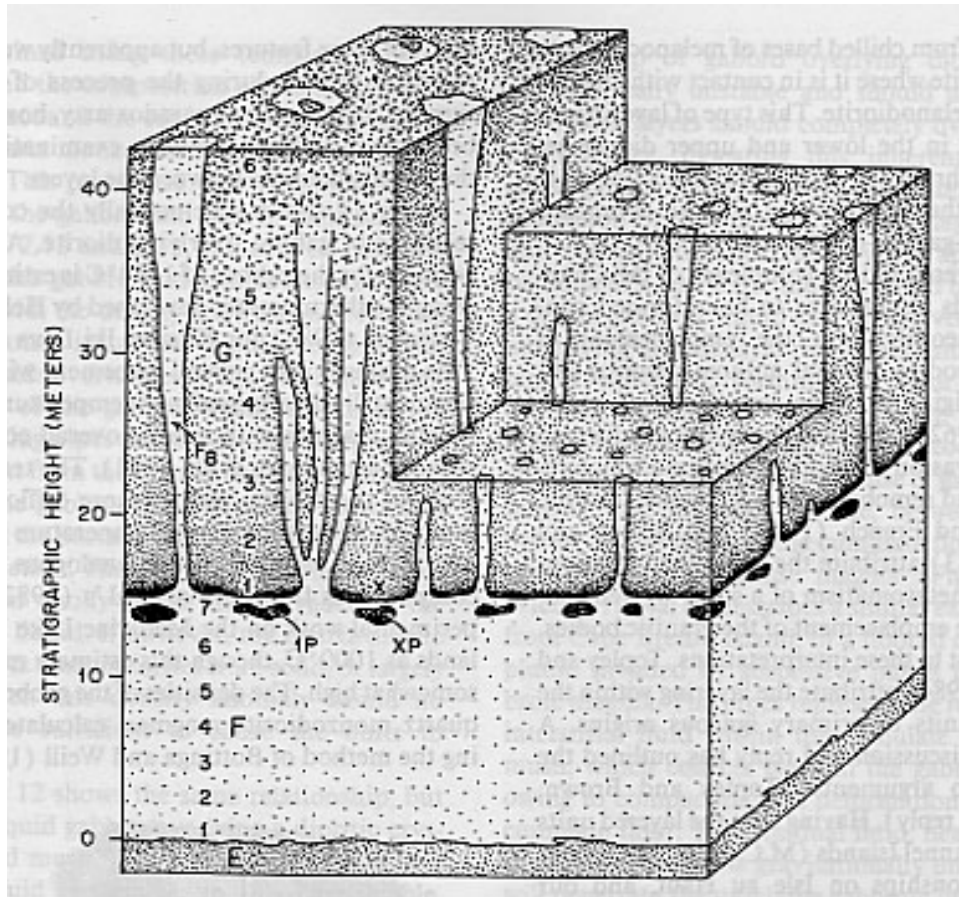


## Side view

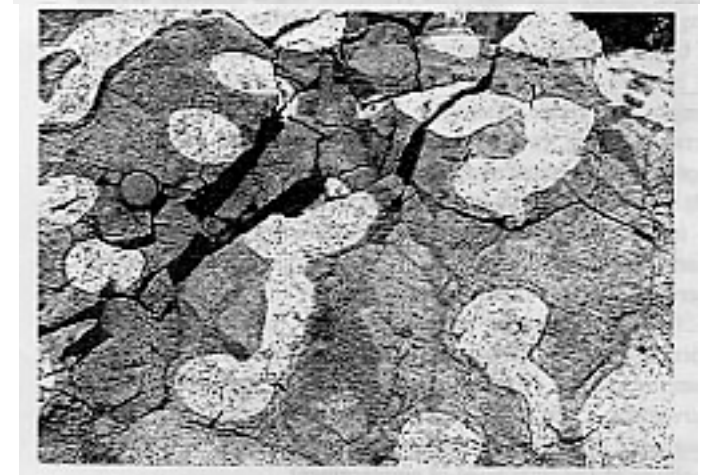
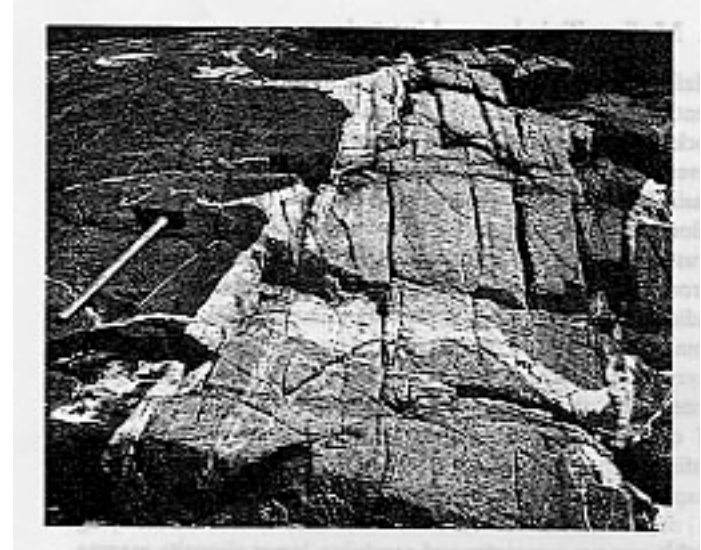




# Field evidence of AFC at the floor

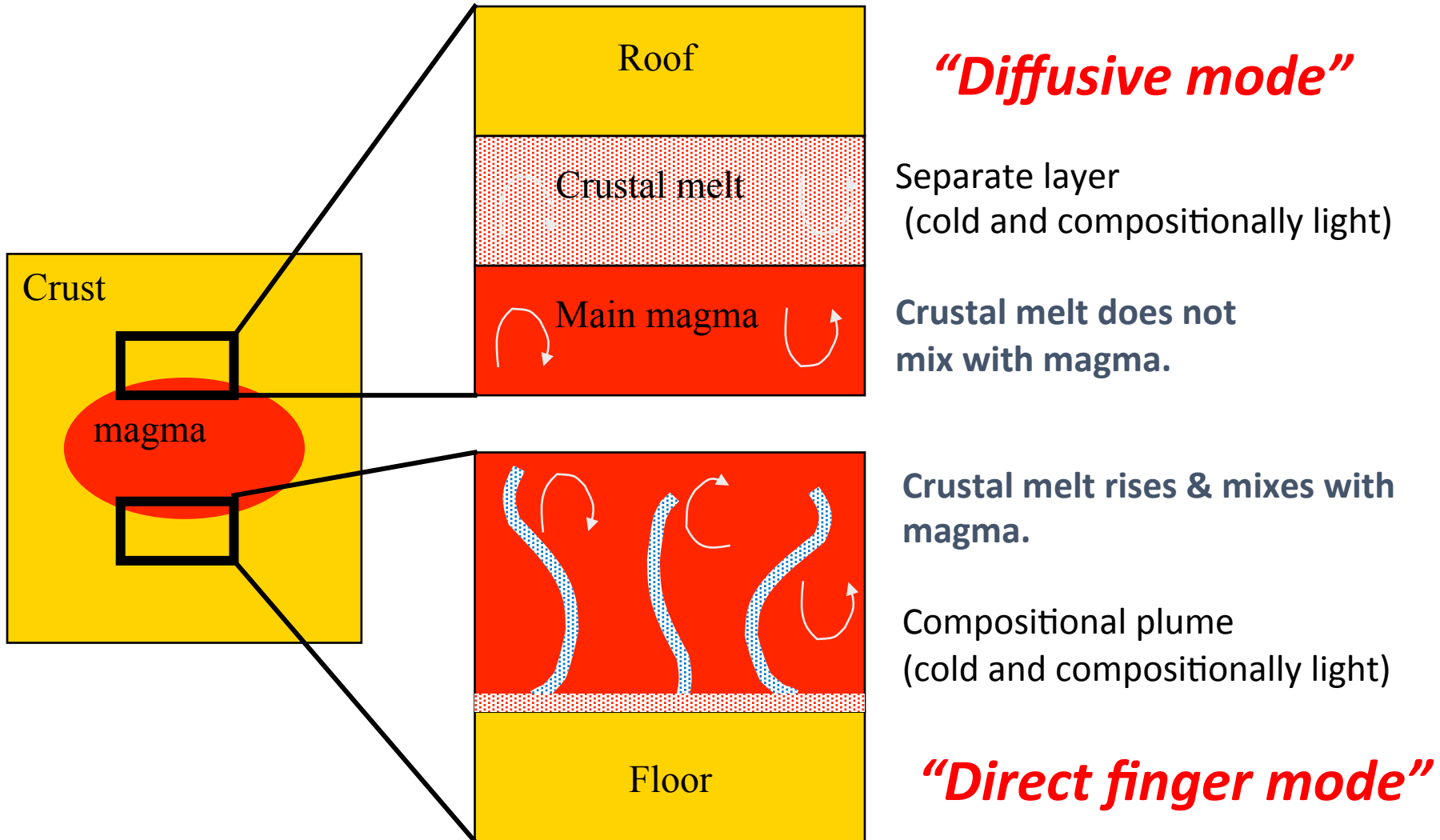


Chapman and Rhodes (1992)

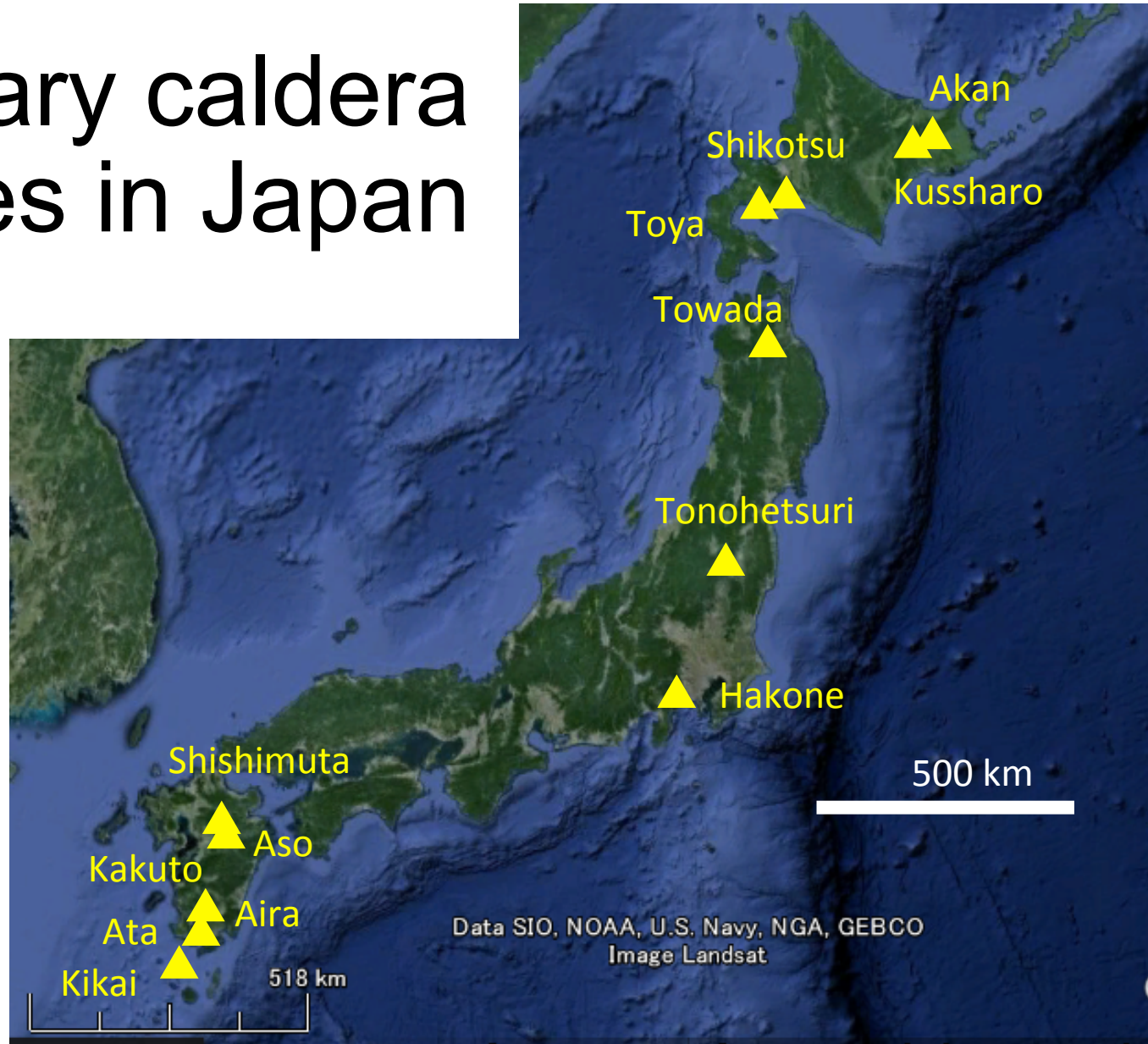


Wiebe (1996)

# Convection in the magma chamber



# Quaternary caldera volcanoes in Japan



>100 km<sup>3</sup>-order



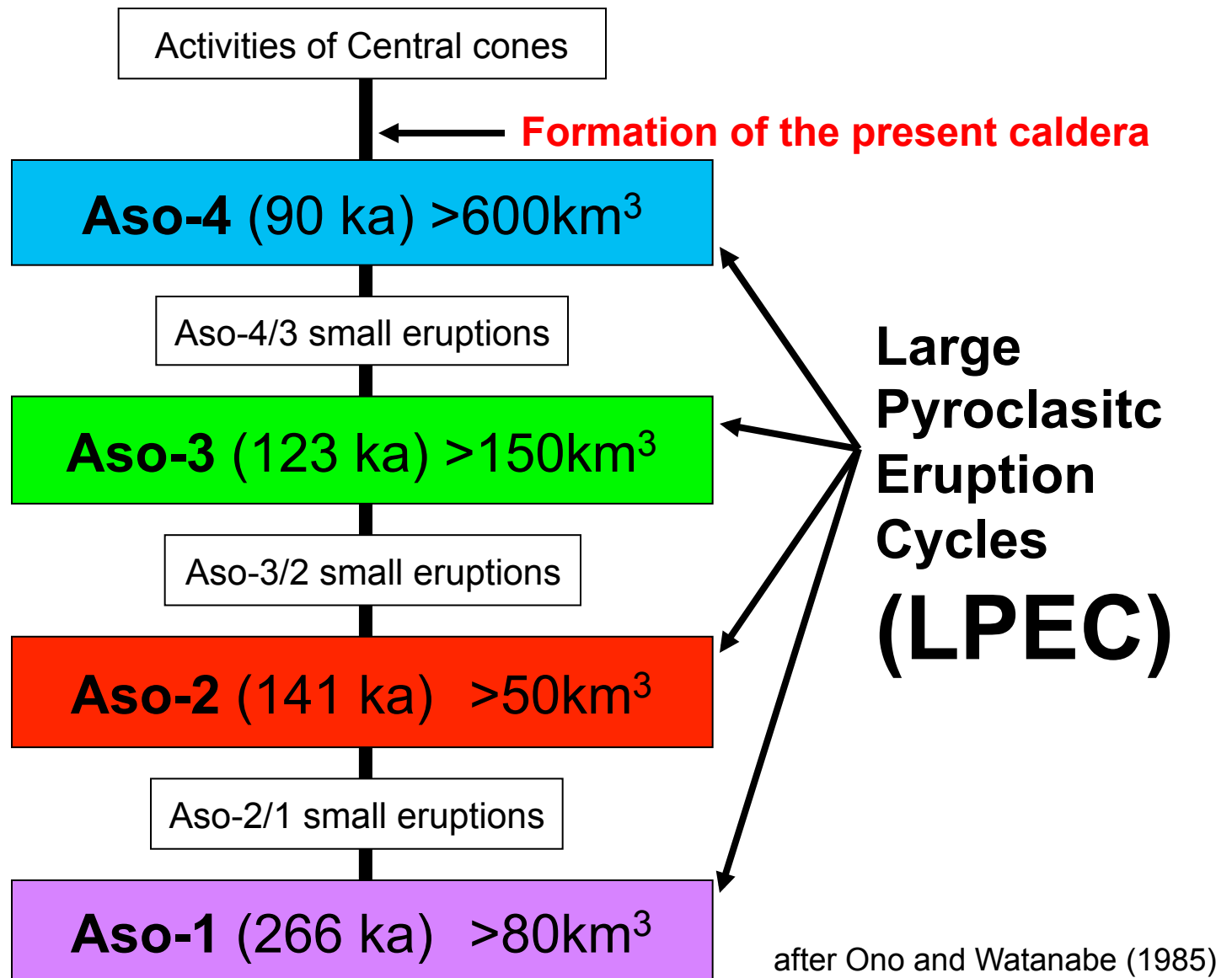
Central cones and caldera  
floor from caldera rim

3 towns and 45,000 people

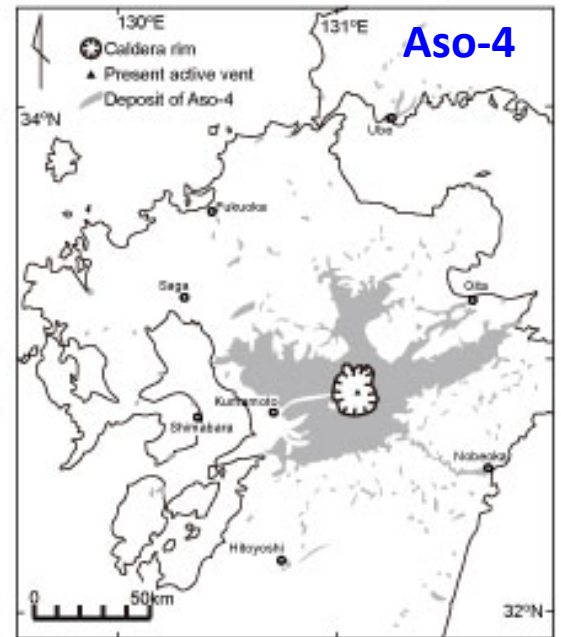
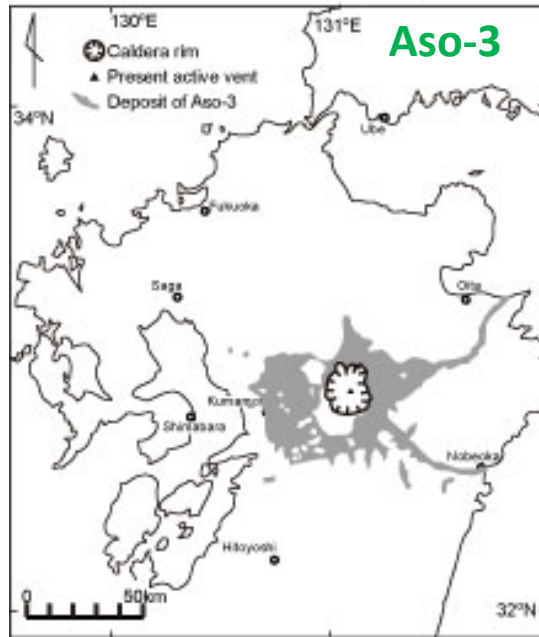
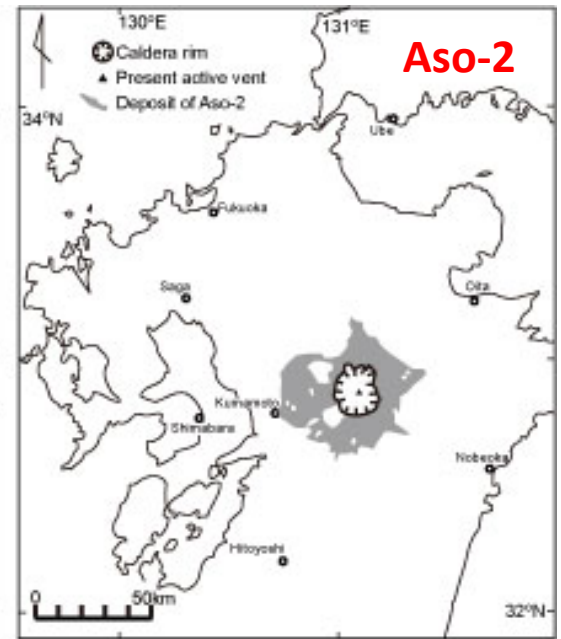
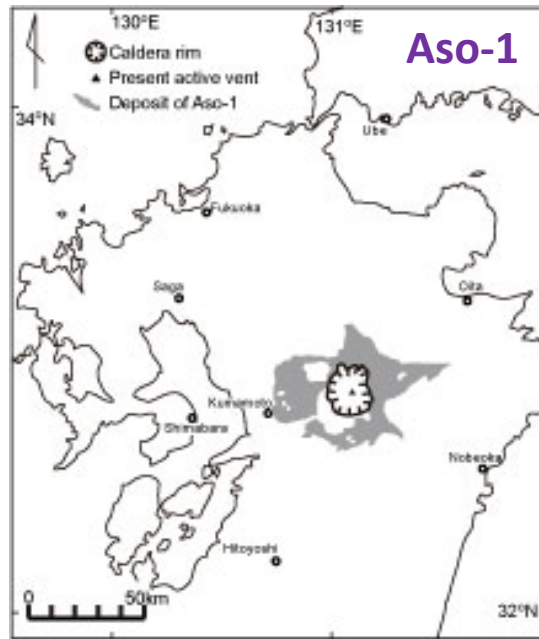
The active crater of  
Nakadake volcano



# Volcanic history of Aso volcano



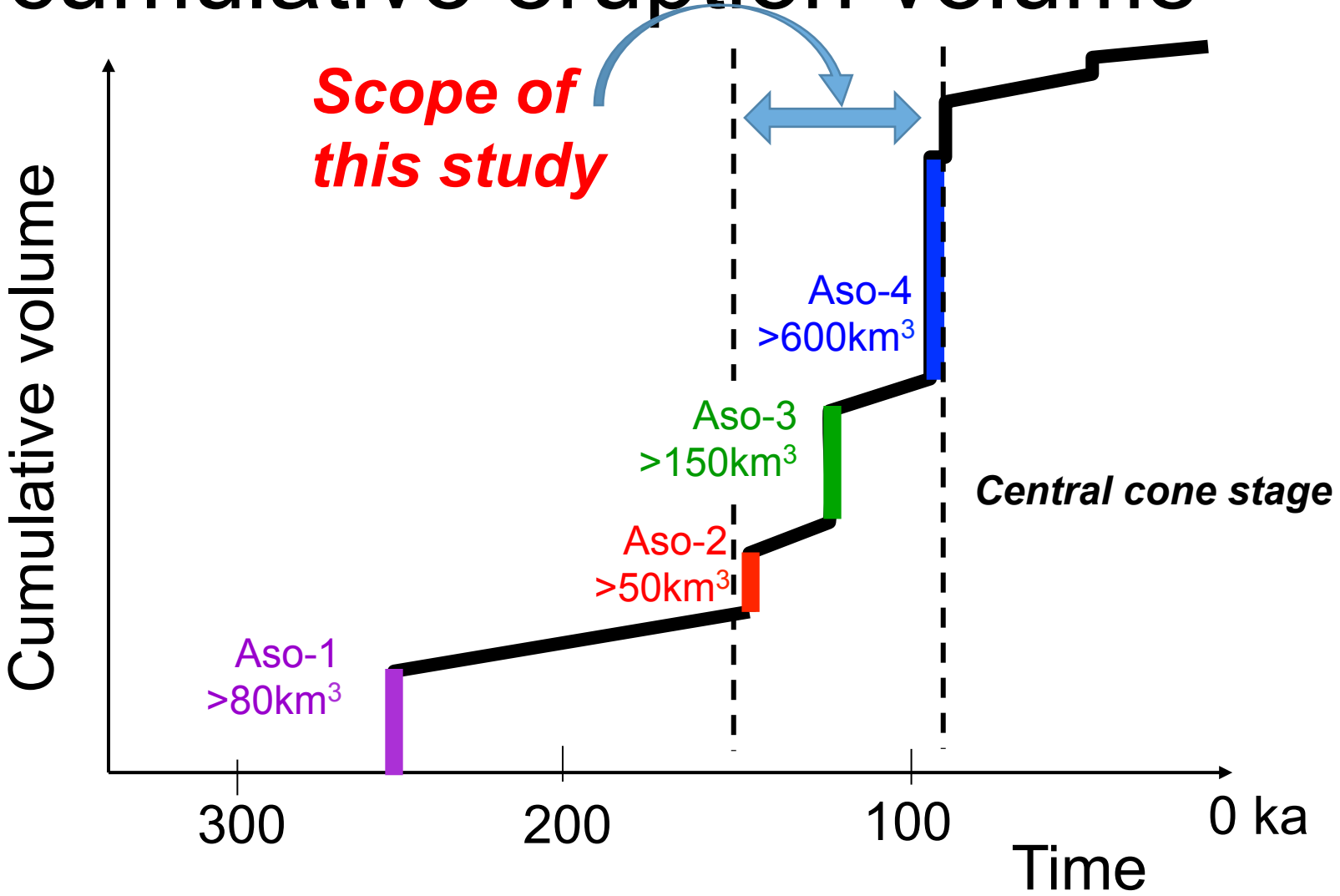
# Deposit distributions of four large pyroclastic eruptions



After Ono and Watanabe(1984)

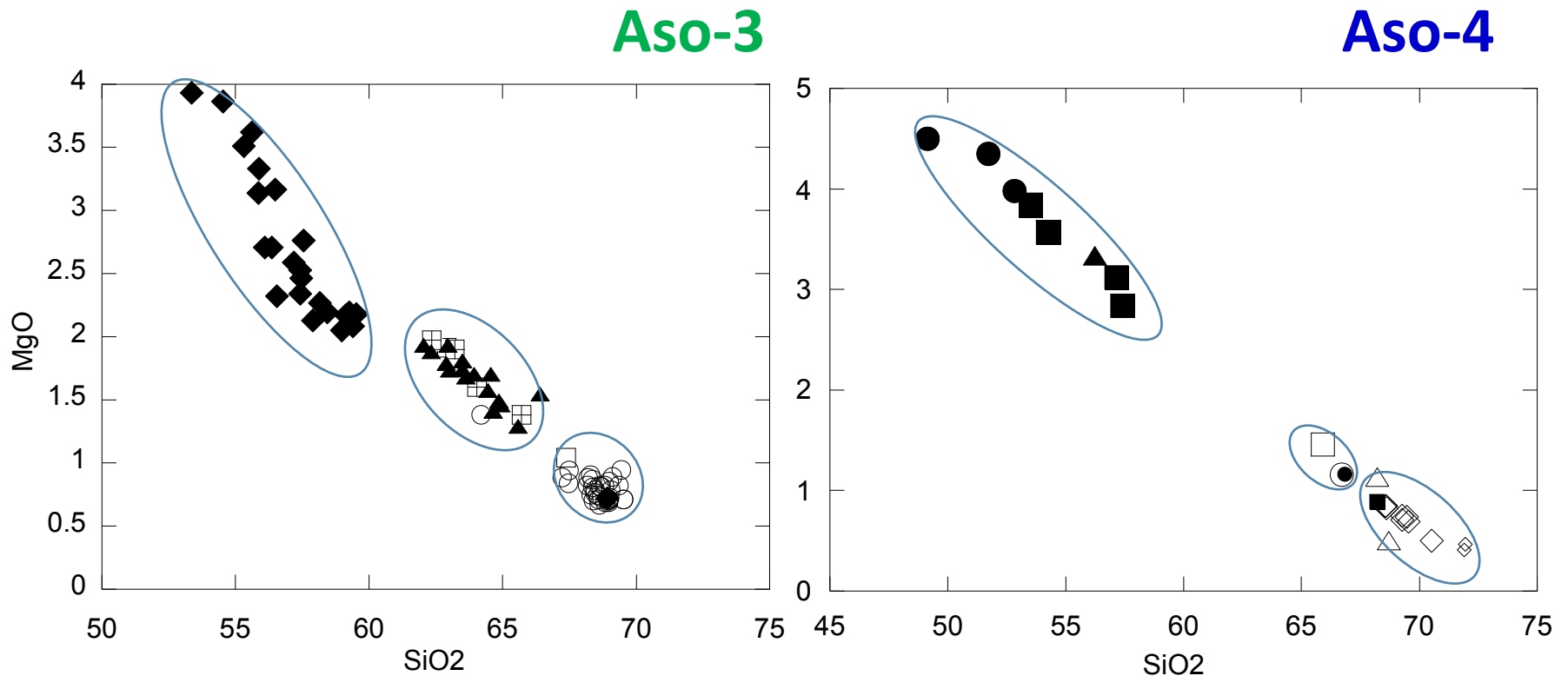


# Schematic diagram of cumulative eruption volume



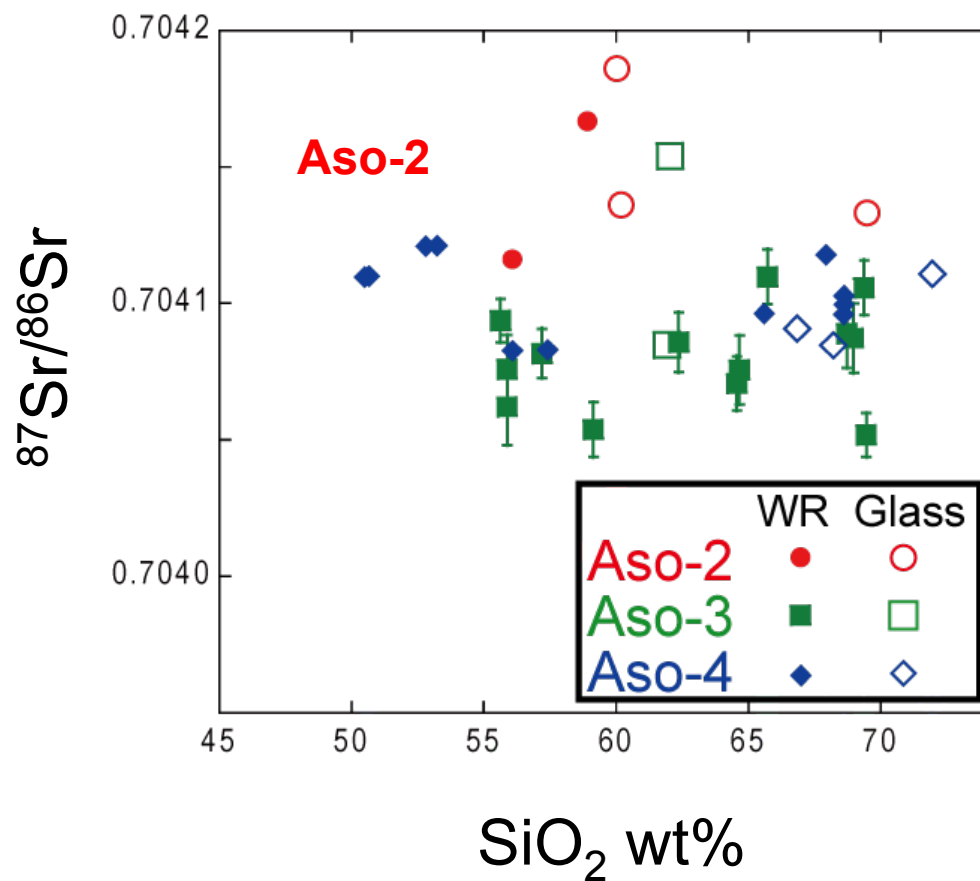


# Whole-rock composition of Aso ejecta

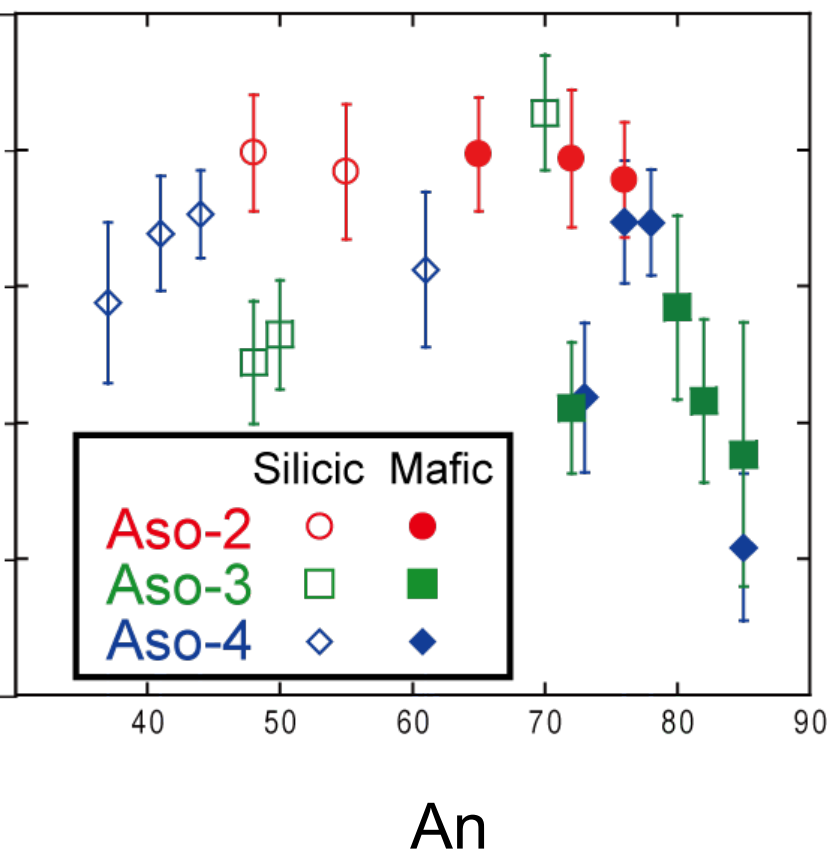


# $^{87}\text{Sr}/^{86}\text{Sr}$ (WR, Glass, PI)

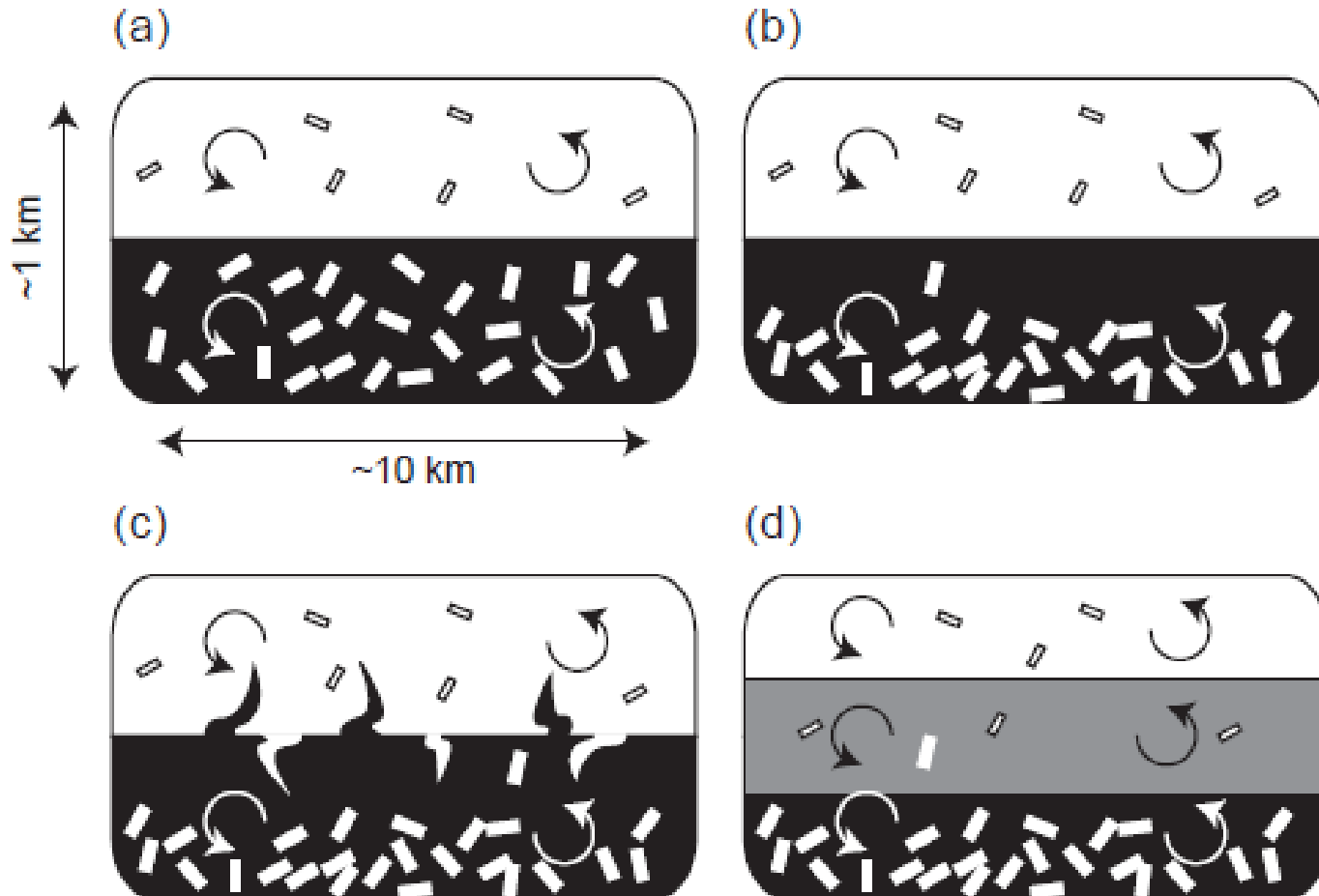
## Whole-rock & Glass



## Plagioclase phenocryst

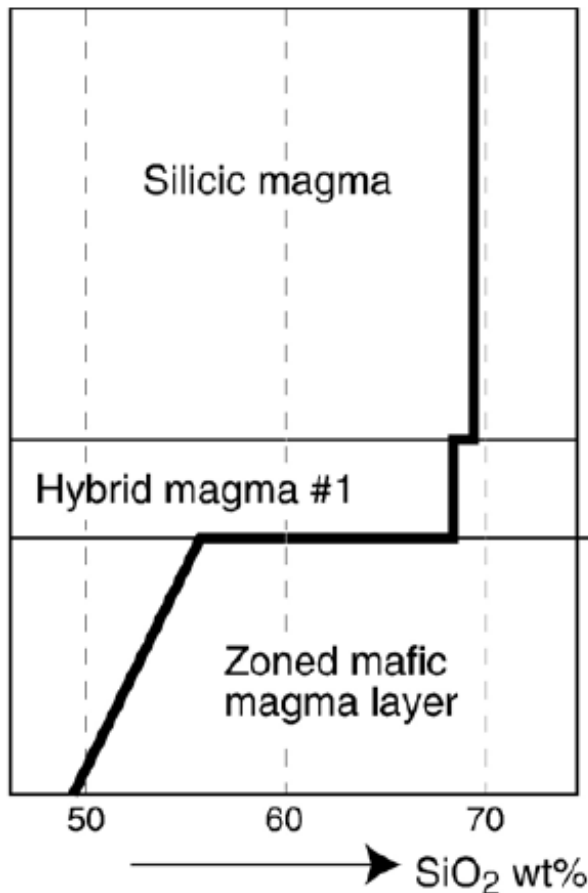


# Magma chamber of the Aso-3 cycle

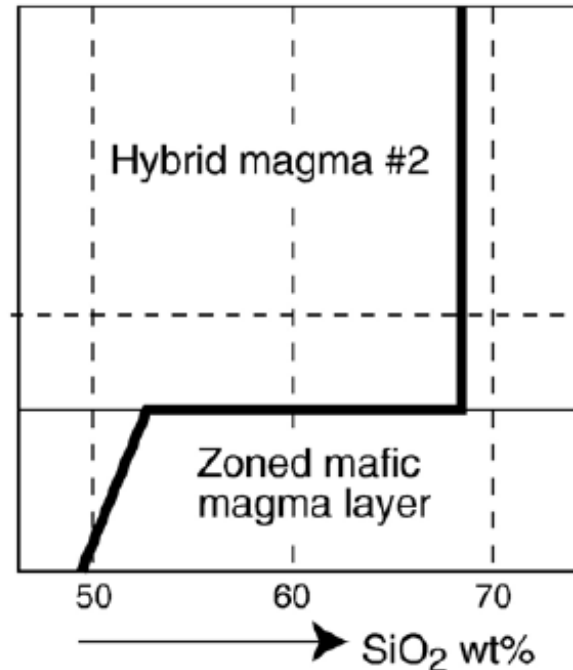


# Magma chamber of the Aso-4 cycle

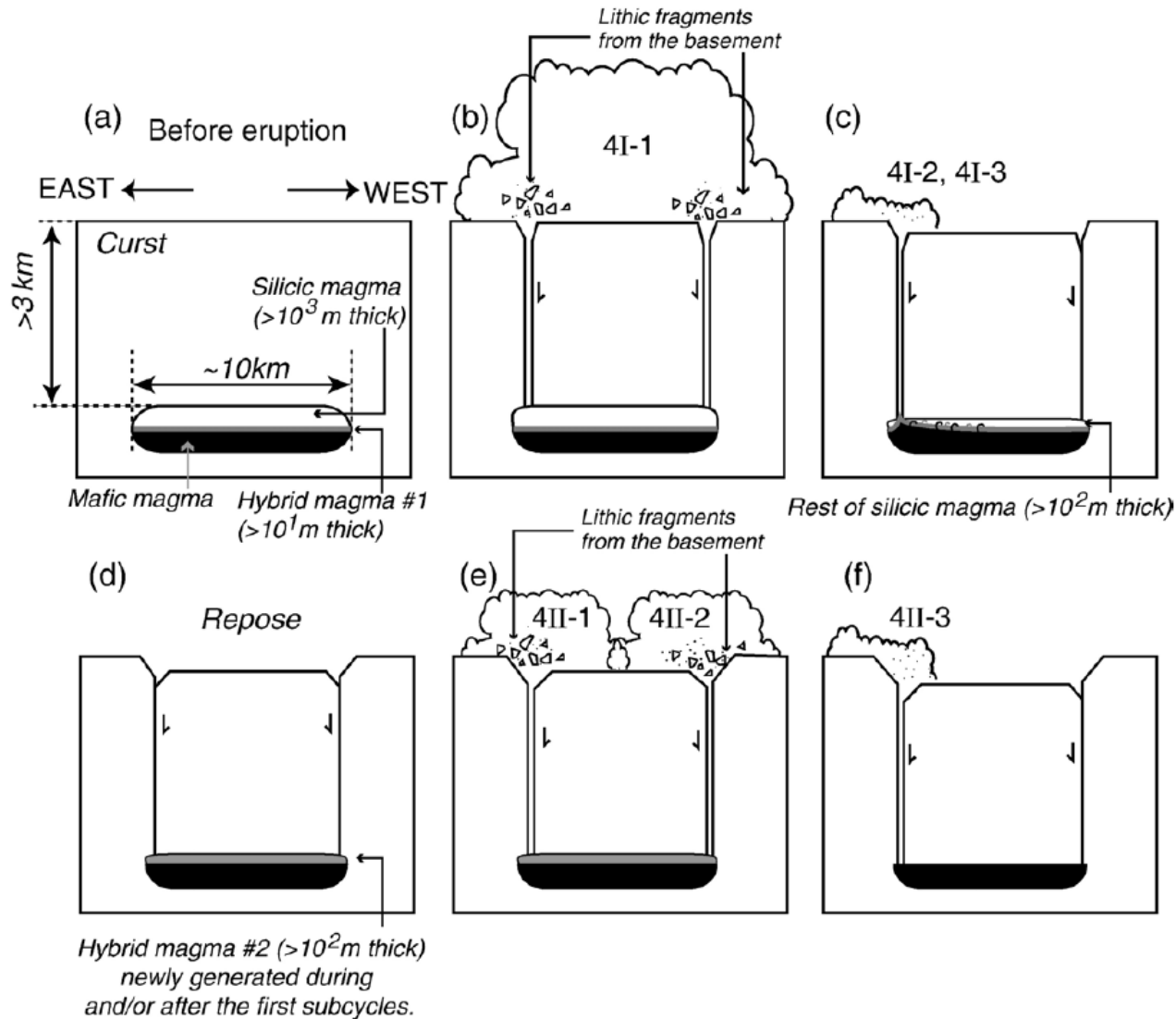
(a) Pre-eruptive magma chamber of the Aso-4 cycle



(b) Magma chamber before eruption of the second subcycle



# Eruption sequence of the Aso-4



# まとめ

- マグマ溜りににおける対流現象では、熱的效果だけでなく、溶融・結晶化によるマグマ組成変化が重要
- マグマ溜りの上面，下面，側面で，異なる二重拡散対流効果
- 阿蘇火山では，2層の成層マグマ溜りから，interfacial mixingにより中間層が形成している。
- マグマ溜り初期条件・境界条件が正確にわからないこと，マグマの複雑な物性のため，予測性をもったマグマ溜り過程の理解はできていない。