# Cyclic tectono-magmatic evolution of TTG source regions in plume-lid tectonics

Horizontal movement



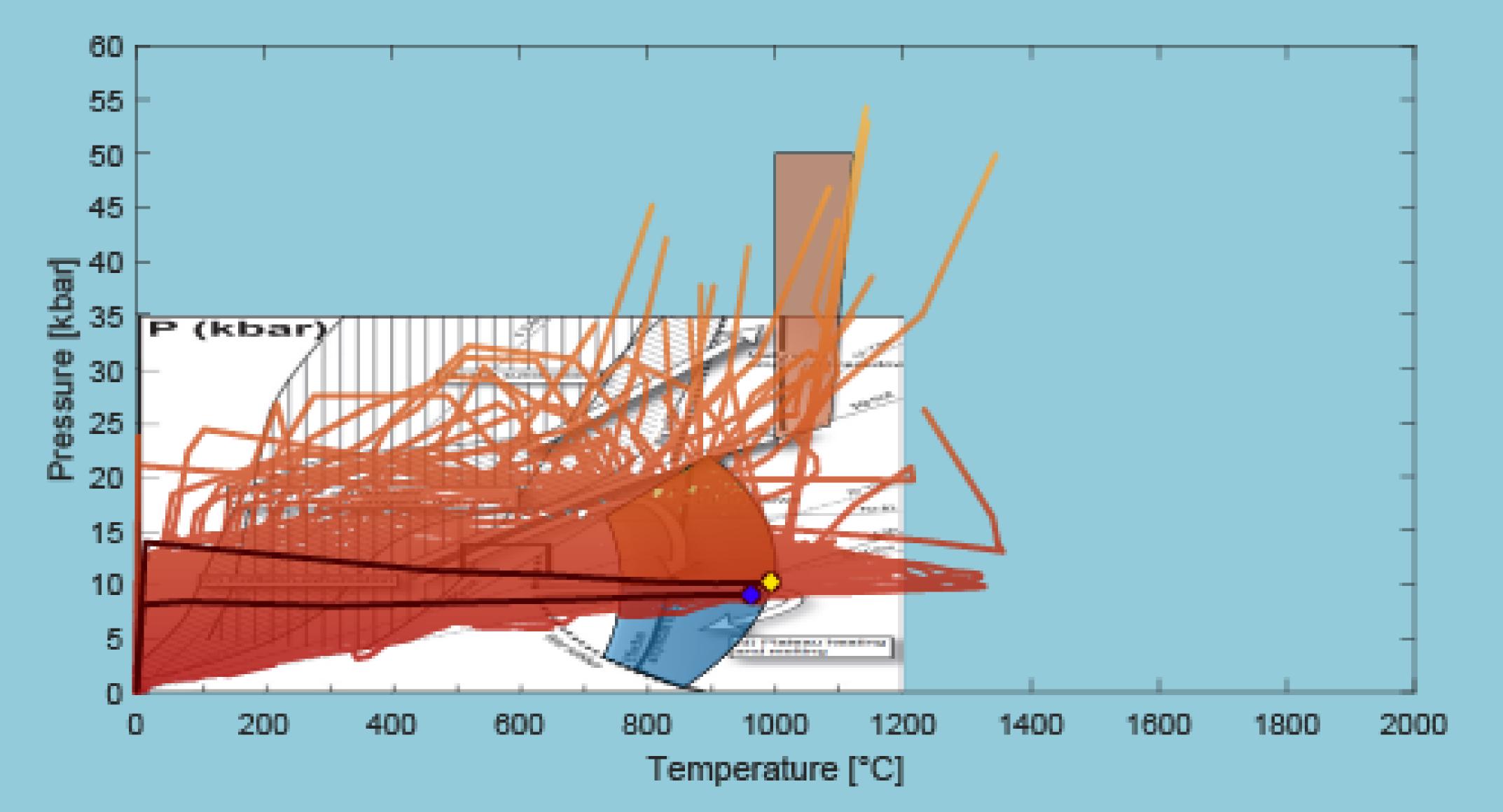
Helmholtz Centre for Ocean Research Kiel



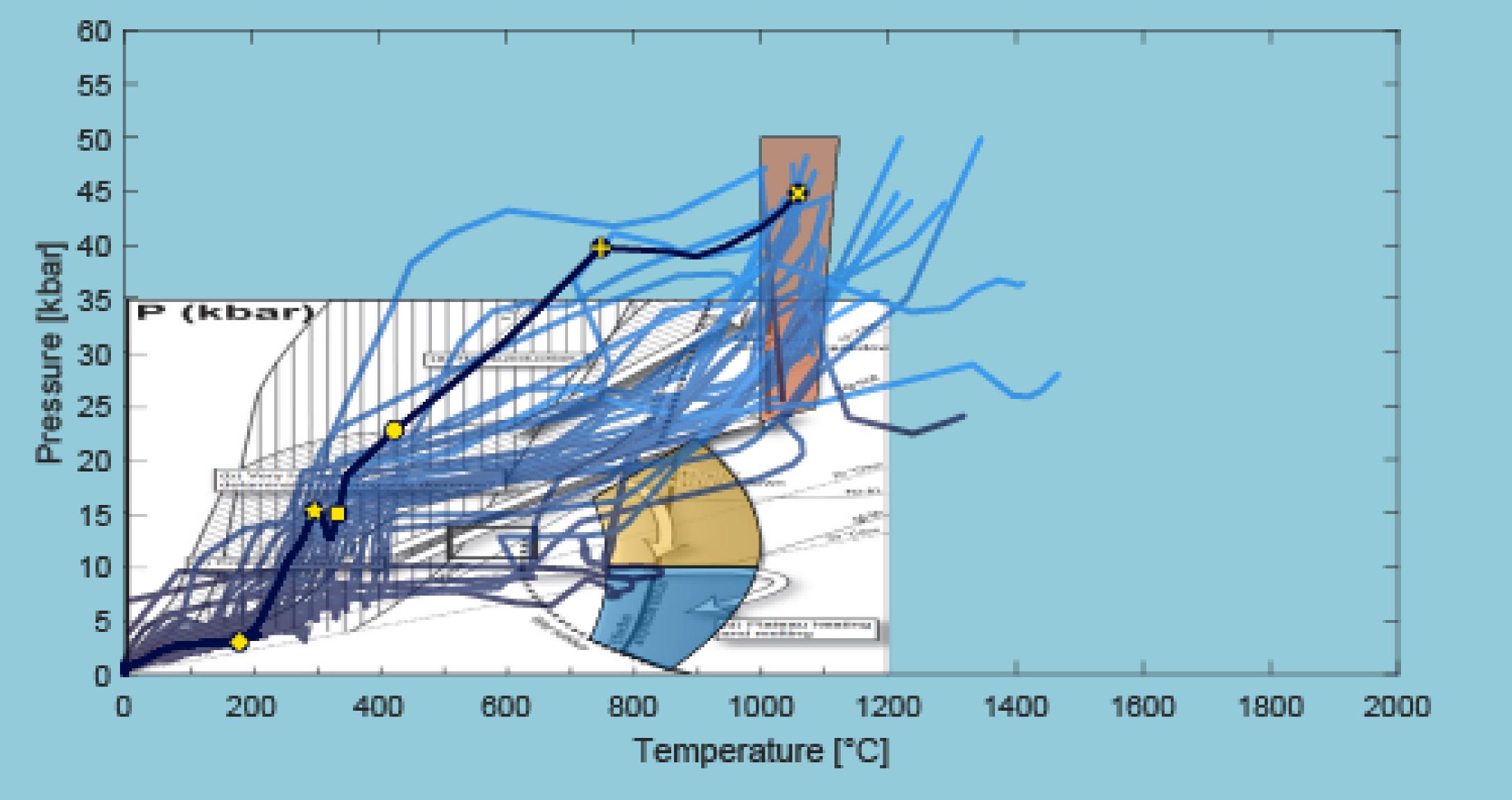
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### LP/MP TTG formation

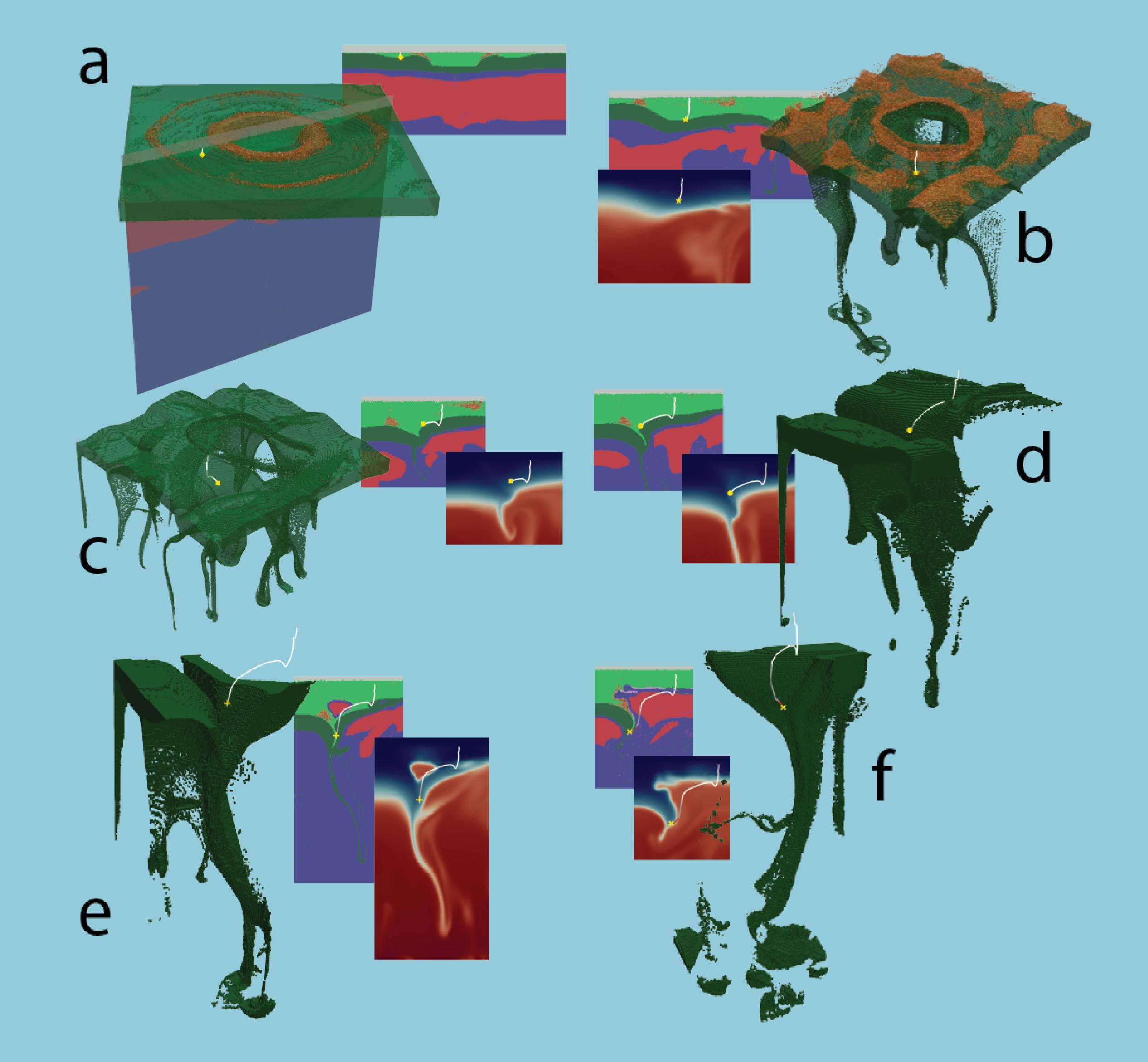


## HP TTG formation



P-T paths of tracers producing LP and MP TTG source melt. Paths indicate a rapid burial and stagnant position at the crust bottom

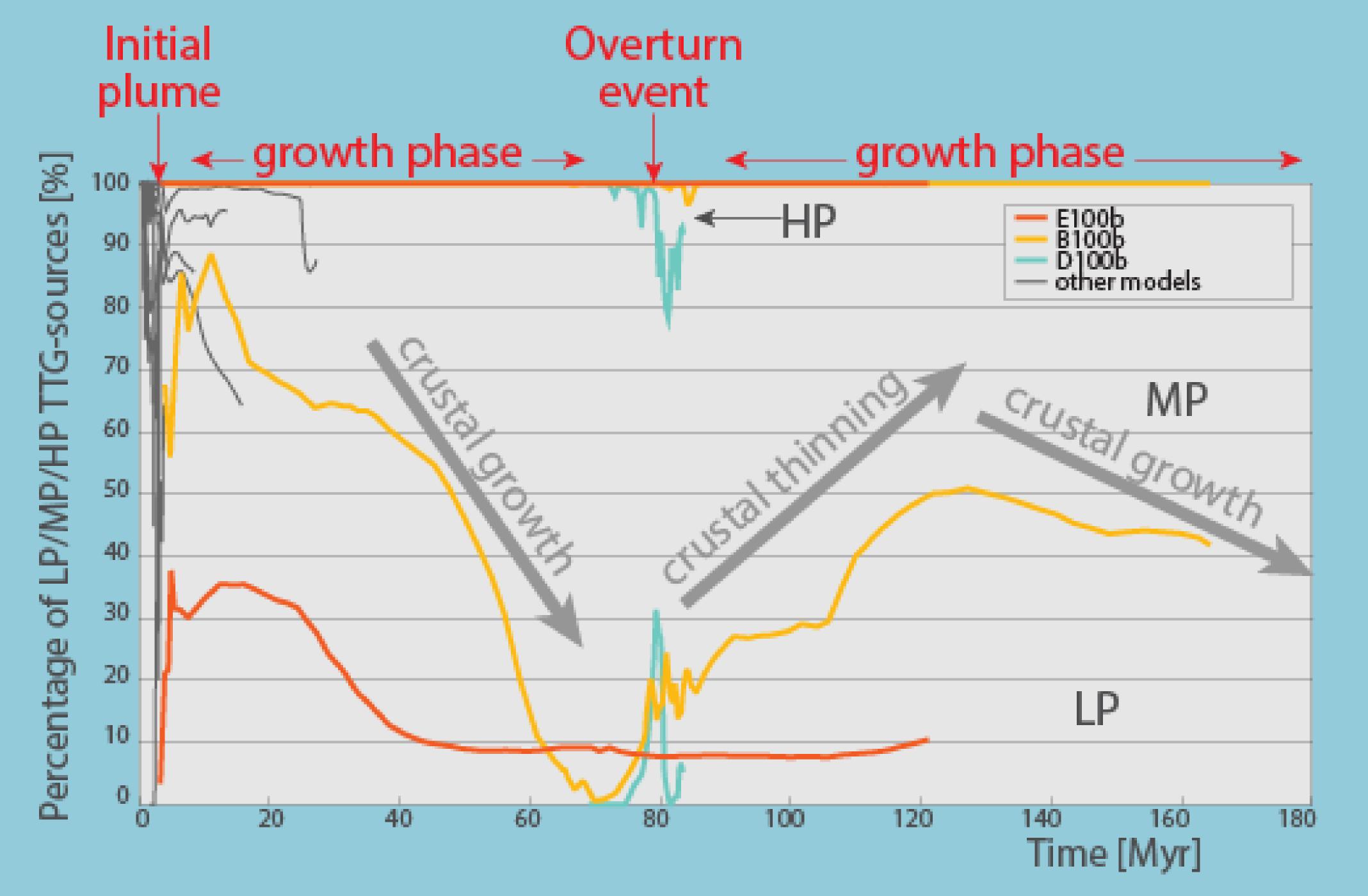
P-T paths of tracers producing HP TTG source melt. These paths indicate a much slower burial which requires additional dynamics.



LP/MP TTG formation are formed continuousely after rapid burial and horizontal motion at crust bottom.

LP/MP TTG for

Time: 25.39 Ma

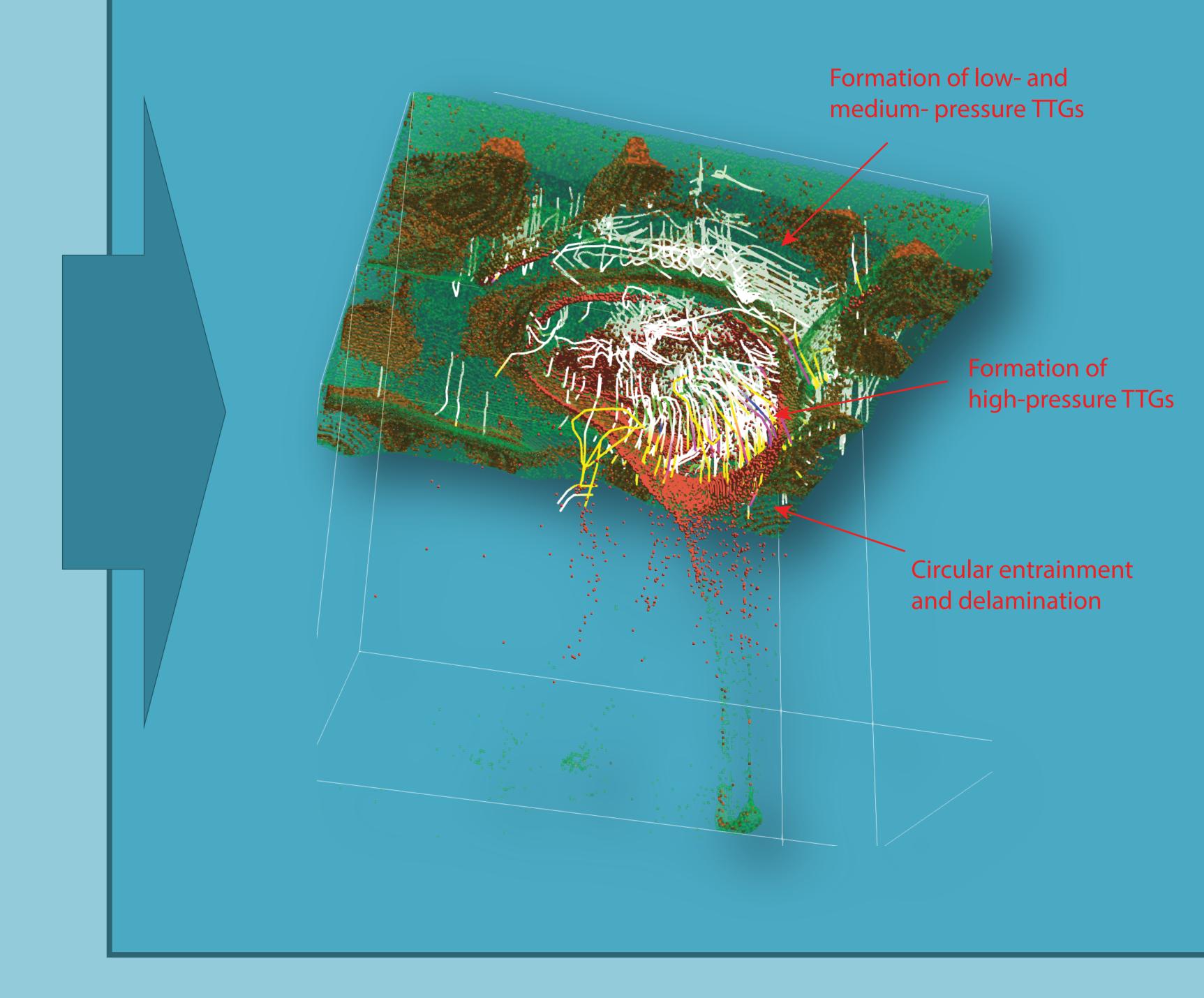


HP TTGs are formed via a delamination or subduction related process and can only be generated during an overturn event.

LP/MP TTGs are formed continuously, while HP TTGs are only formed during an overturn event. This leads to a change in ratios of LP/MP/HP TTGs during a crustal growth and overturn cycle.

Crustal partial melt layer

#### 4. Conclusions:



#### **TTG formation**

LP/MP TTGs are formed continuously by crustal convection

The ratio of LP/MP TTGs gives an approximation of mantle depth

HP TTGs are formed in **pulses** of ~100 Myr during an **overturn event** 

HP TTGs require slow sinking and are an indication of delamination or subduction