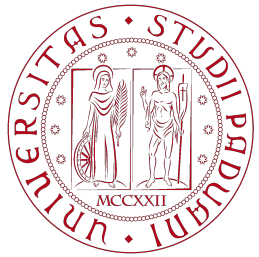


UNIVERSITÀ
DEGLI STUDI
DI PADOVA

DIPARTIMENTO
DI GEOSCIENZE

Analisi isotopiche Re-Os di campioni di sill CAMP in Amazzonia

Tesi di Laurea Triennale in Scienze Geologiche

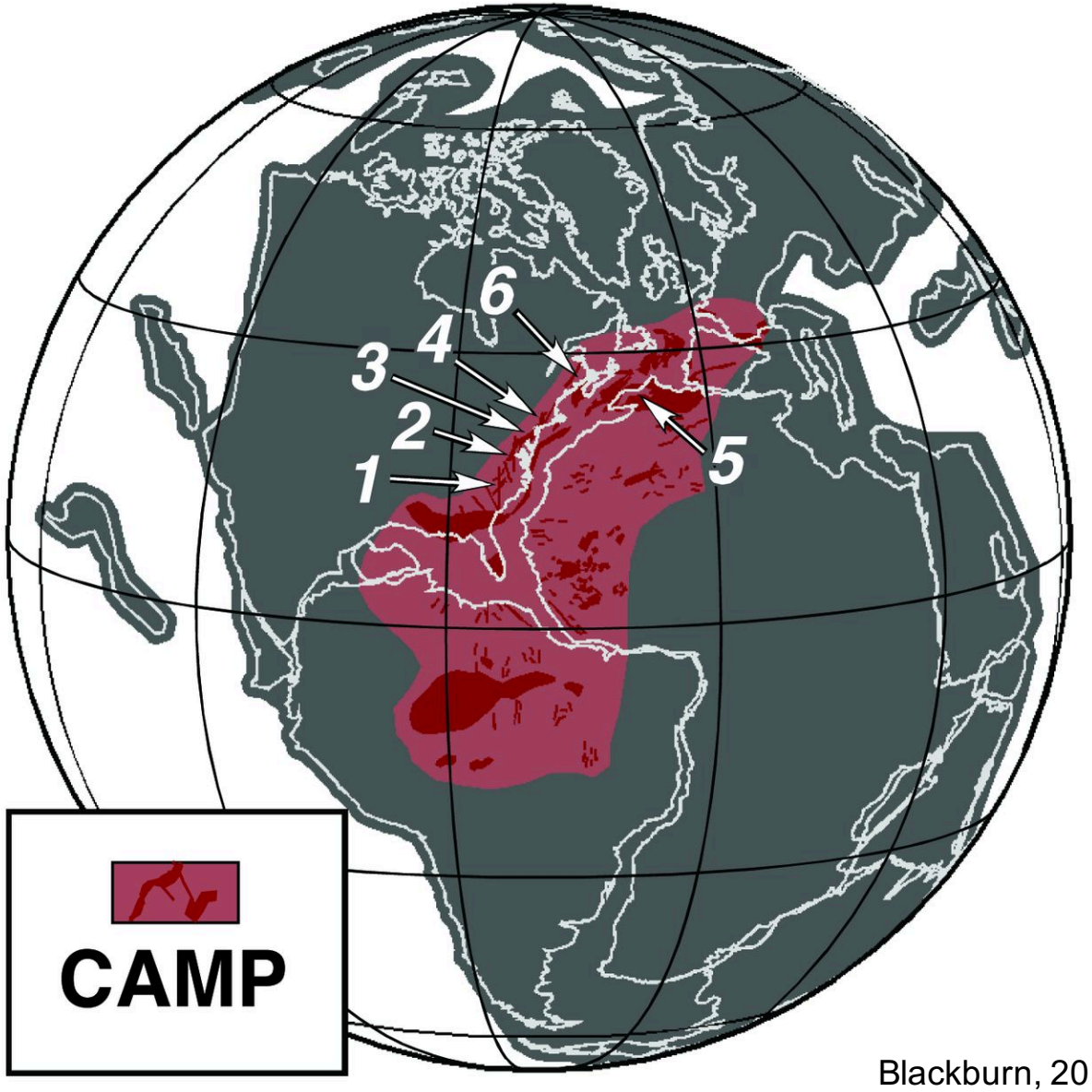
Anno accademico 2016/2017

Studente: Fabio La Valle

Relatore: Andrea Marzoli

INQUADRAMENTO

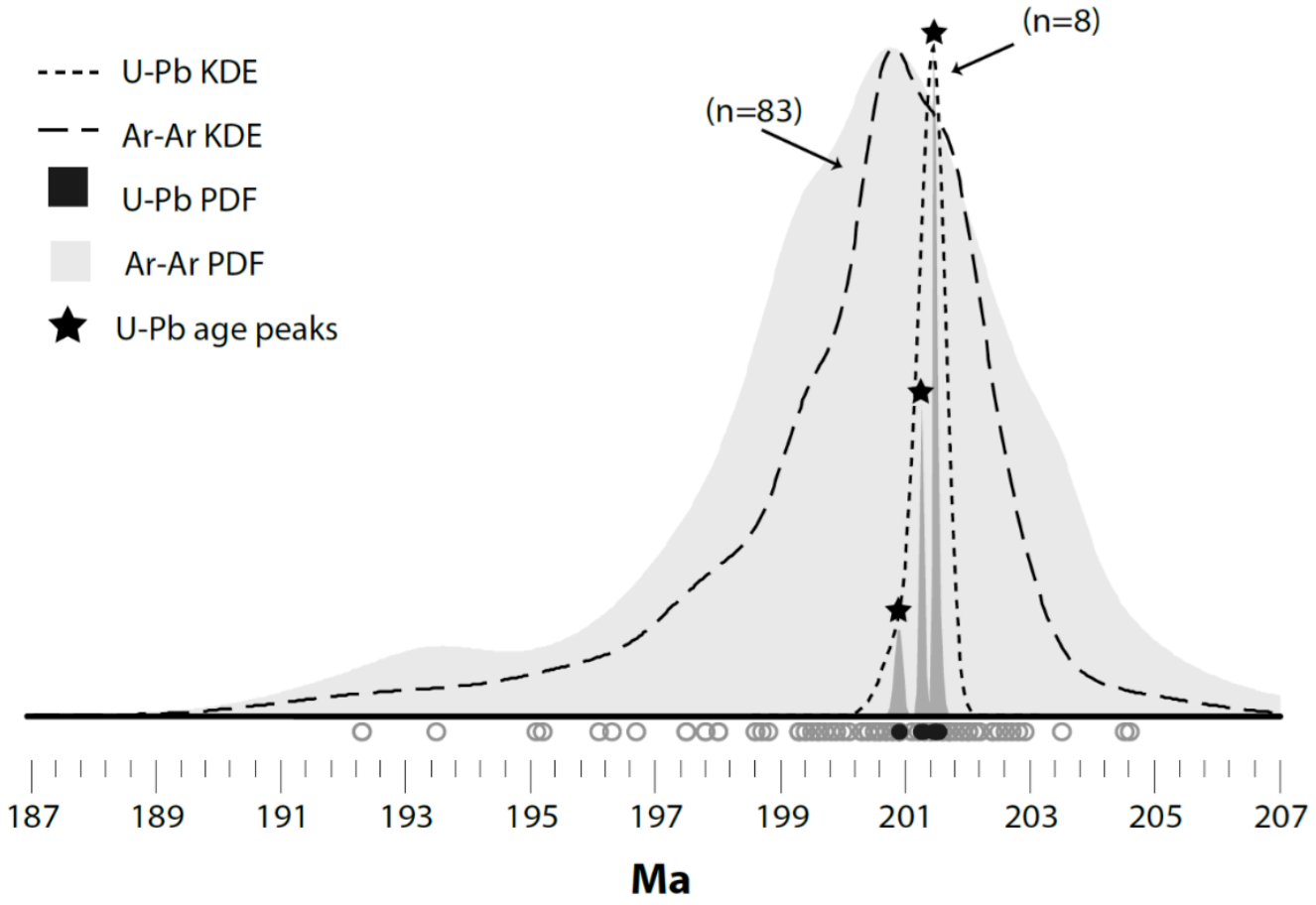
- La CAMP è una LIP (Large Igneous Province)
- Messa in posto tramite colate e intrusioni
- Estensione: 10 Milioni di Km^2
- Volume stimato 3 Milioni di Km^3
- Affioramenti in Africa, Europa; Nord e Sud America
- Origine legata a tettonica estensionale



Blackburn, 2013

ETA' della CAMP

- Datazioni ^{40}Ar-^{39}Ar (Plg) e $^{238}U/^{206}Pb$ (Zircone)
- Picco di attività magmatica a **201 Ma**
- **Breve durata**: 1 Ma
- Attività minore prolungata fino a 192 Ma



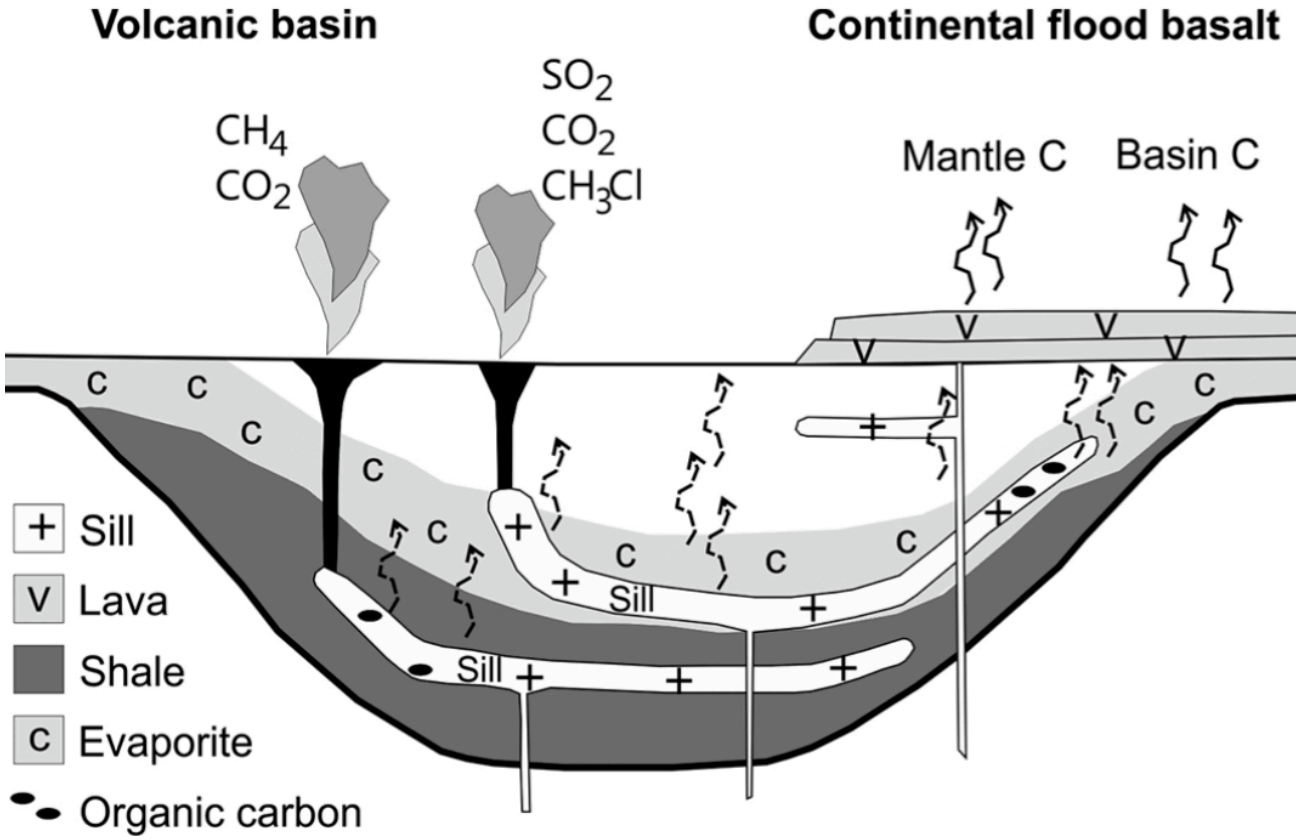
Davies, 2017

CORRELAZIONE con la ETE

- Datazioni della CAMP sincrone (entro gli errori) con l'**E**nd **T**riassic Mass **E**xtintion

- L'ETE è un'estinzione di massa tra le BIG FIVE, provocata da un forte riscaldamento e alterazione dell'atmosfera (CO_2, SO_2...)

- ETE documentata da molti proxy, di cui il principale è l' **escursione negativa del $\delta^{13}C$** . Tale variazione può essere dovuta a:
  - CH_4 e CO_2 da colate basaltiche
  - metamorfismo di contatto su sedimenti ricchi in Carbonio
  - emissioni di solfuri per fusi ricchi in Zolfo, provenienti da litosfera cratonica



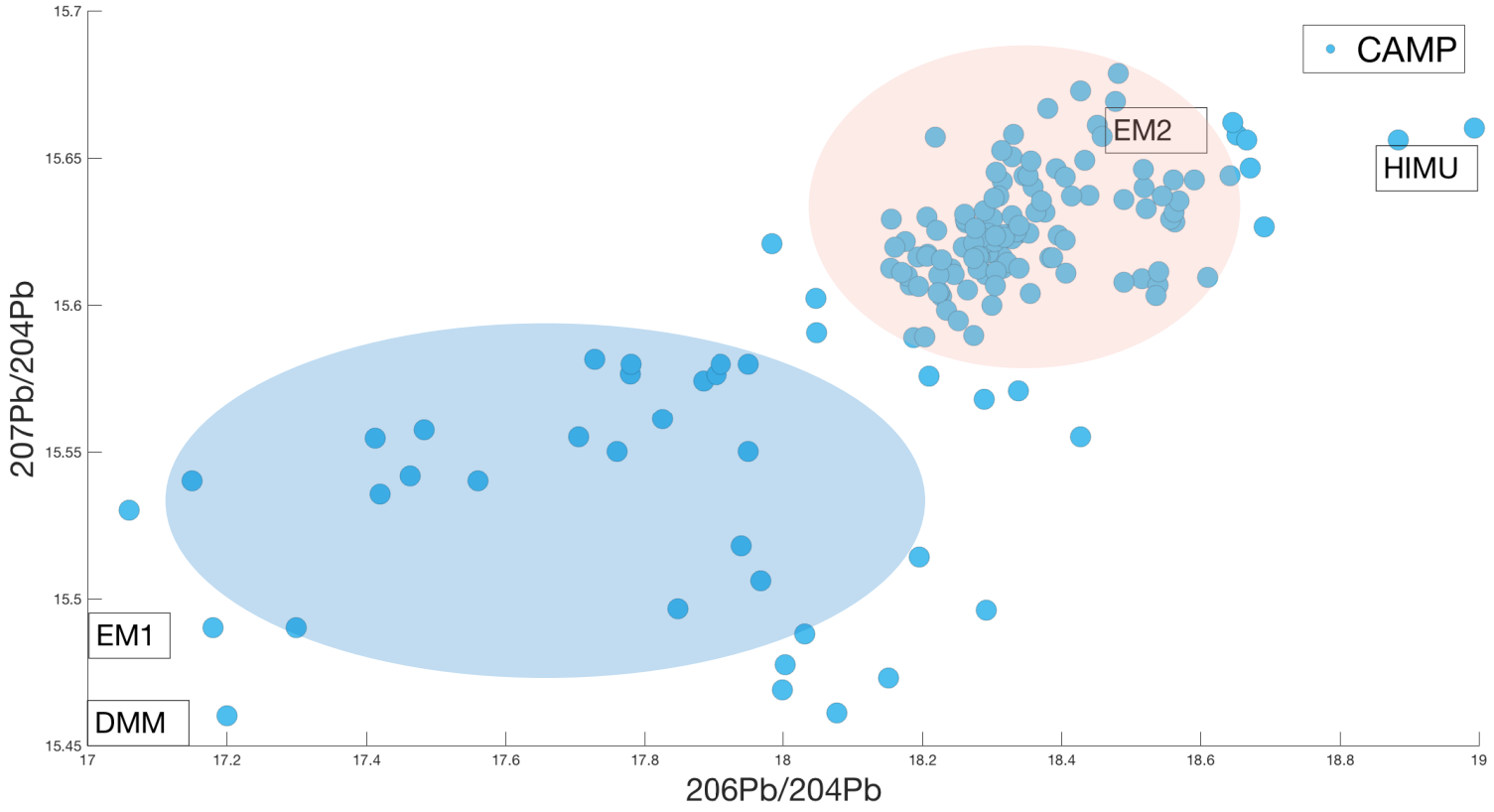
Svensen 2015

CLASSIFICAZIONE e GEOCHIMICA

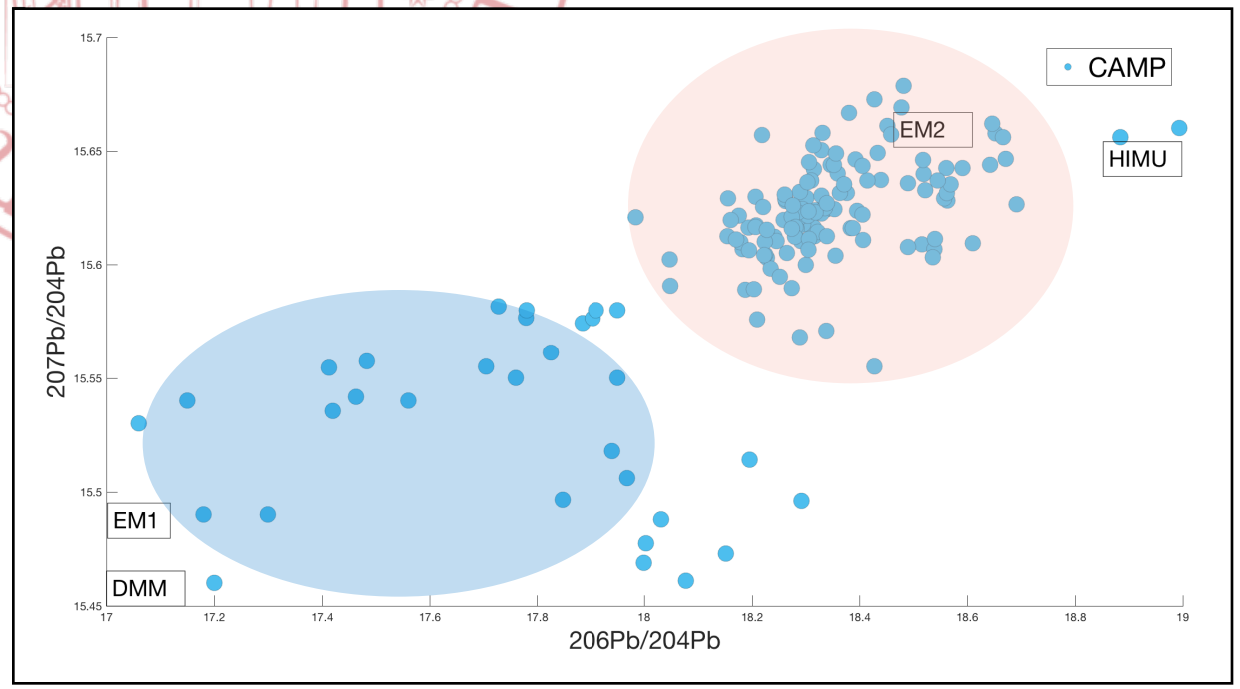
- Diagramma TAS: Basalti e Basalti andesitici

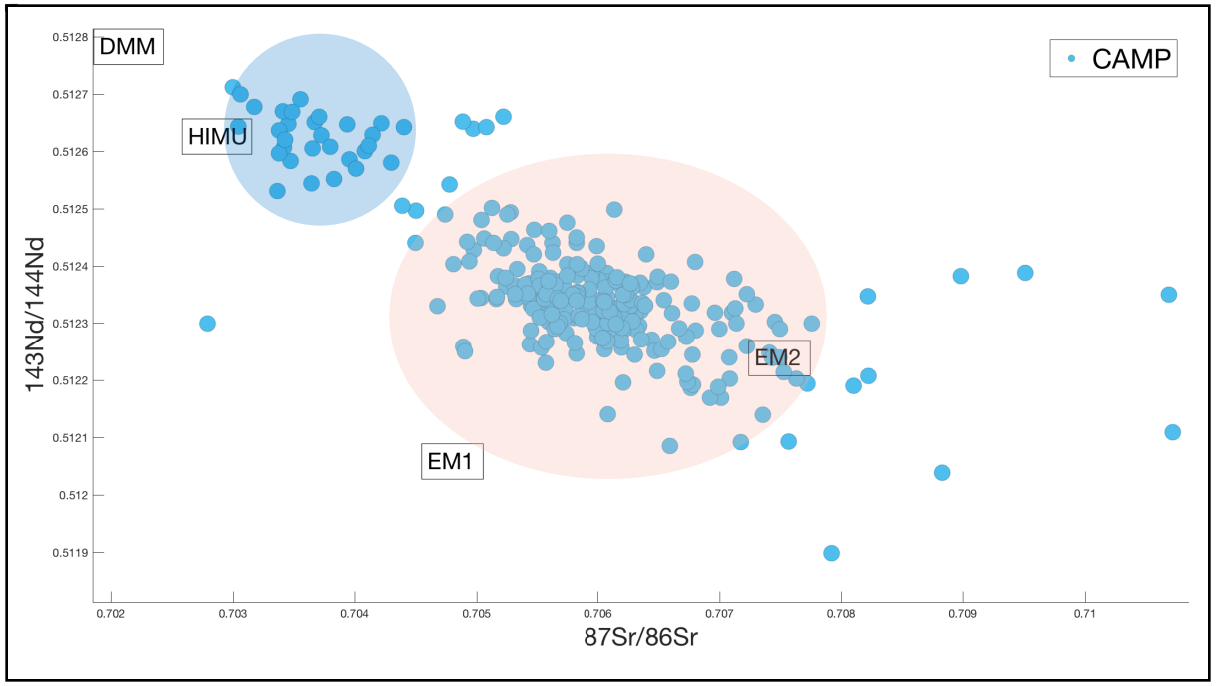
- 90% Low-Ti (TiO_2<2wt%)
  - Alto $^{87}Sr/^{86}Sr$
  - Basso $^{143}Nd/^{144}$ Nd
  - Alto Pb $^{206}Pb/^{204}Pb$ e $^{207}Pb/^{204}Pbi$

- 10% High-Ti (TiO_2>2wt%)
  - Basso $^{87}Sr/^{86}Sr$
  - Alto $^{143}Nd/^{144}$ Nd



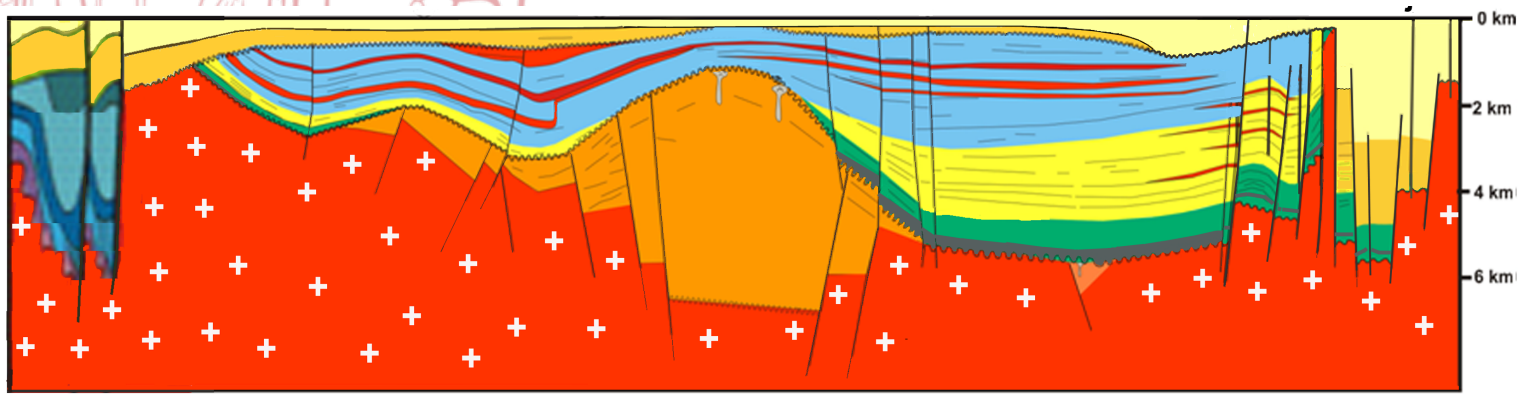
ORIGINE dei MAGMI





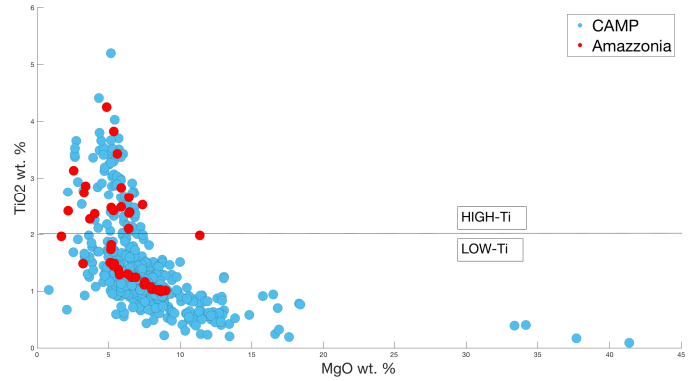
- Low-Ti
  - Arricchimento in Sr, Nd, Pb per riciclo materiale crostale
- High-Ti
  - fonte alternativa, da valutare zona per zona

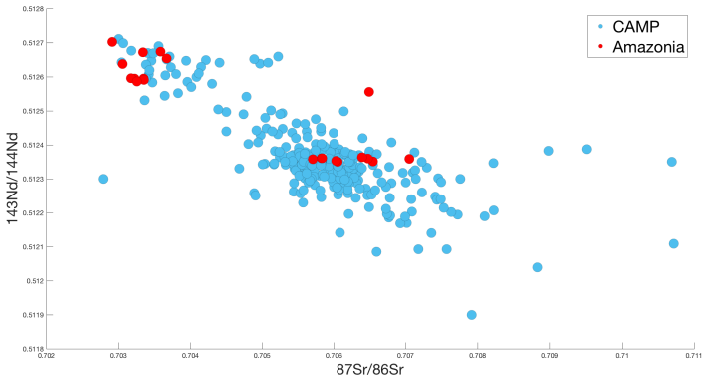
la CAMP in AMAZZONIA

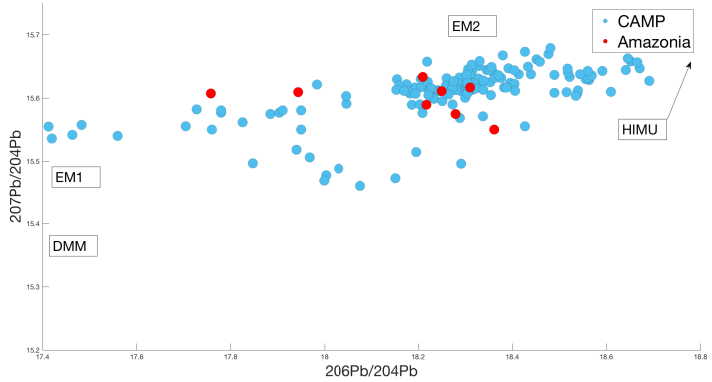


COLUNA ESTRATIGRÁFICA DAS BACIAS DO SOLIMÕES E DO AMAZONAS

- Sequenza di alti e bassi strutturali del basamento, formazione di bacini sedimentari
- Magmatismo: intrusioni di dicchi e Sill
- Geochimica e datazioni mostrano che il magmatismo è CAMP







ISOTOPI dell'OSMIO

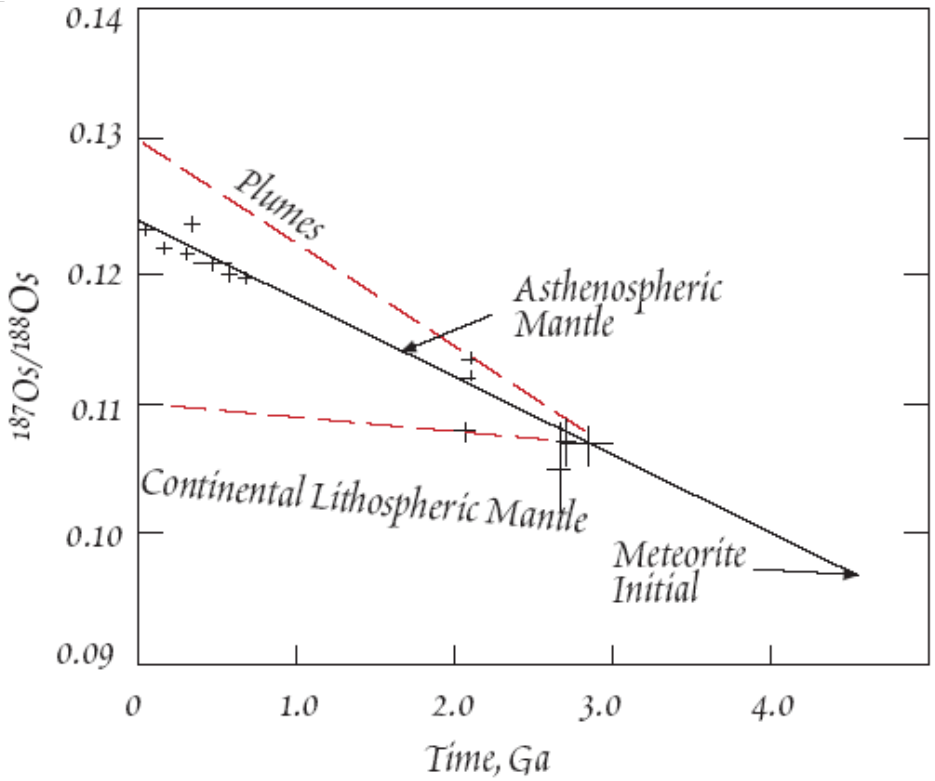
Re e Os **elementi siderofili**, impoveriti in mantello e crosta rispetto al nucleo;

Re elemento incompatibile, Os compatibile in minerali di mantello: tramite la fusione del mantello il rapporto Re/Os aumenta notevolmente (circa x100);

$^{187}Re \rightarrow ^{187}Os + \beta^-$, demi-vita 42 10^9 anni;

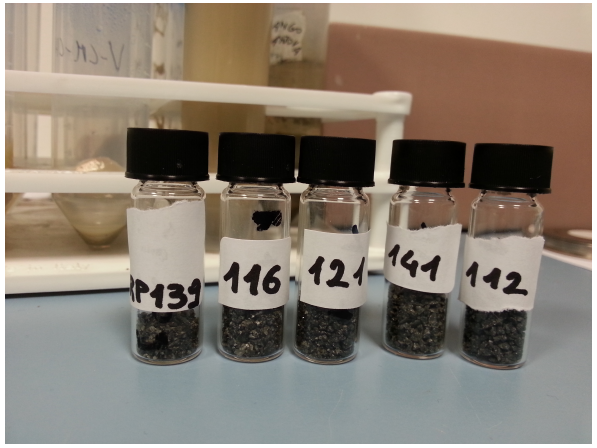
Valore isotopico $^{187}Os/^{188}Os$

la forte differenziazione tra Re e Os che avviene nei processi magmatici permette di usare questo sistema come un ottimo **tracciante della sorgente dei magmi**.



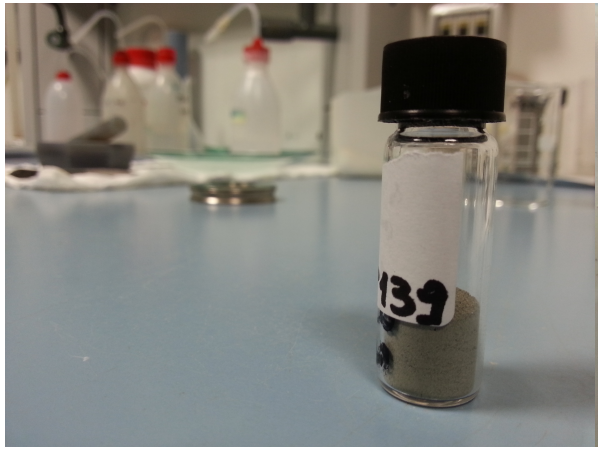
CAMPIONI

Sill in amazzonia

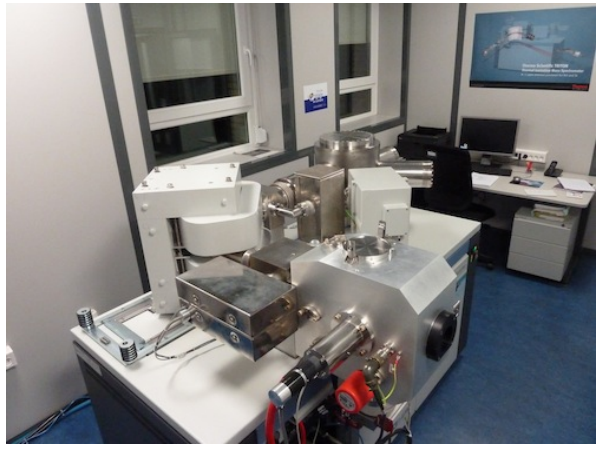


Picking

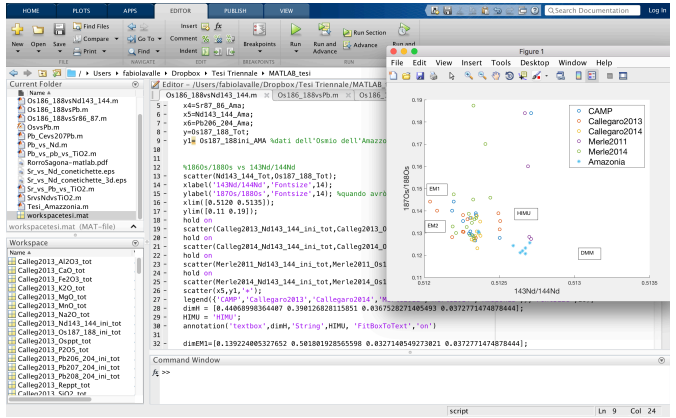
Lavaggio a ultrasuoni



Macinazione

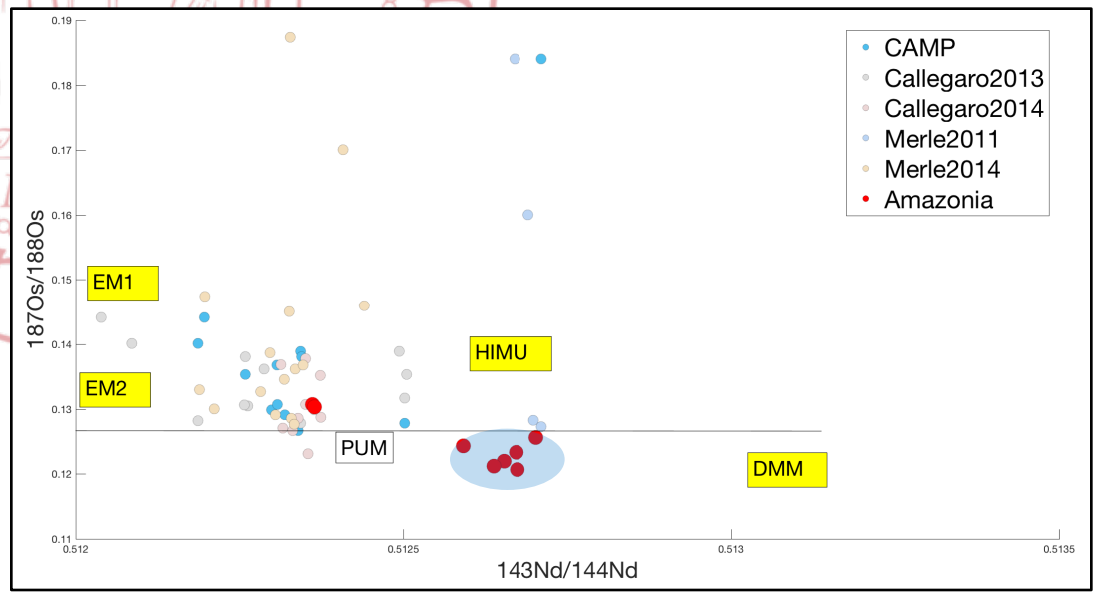


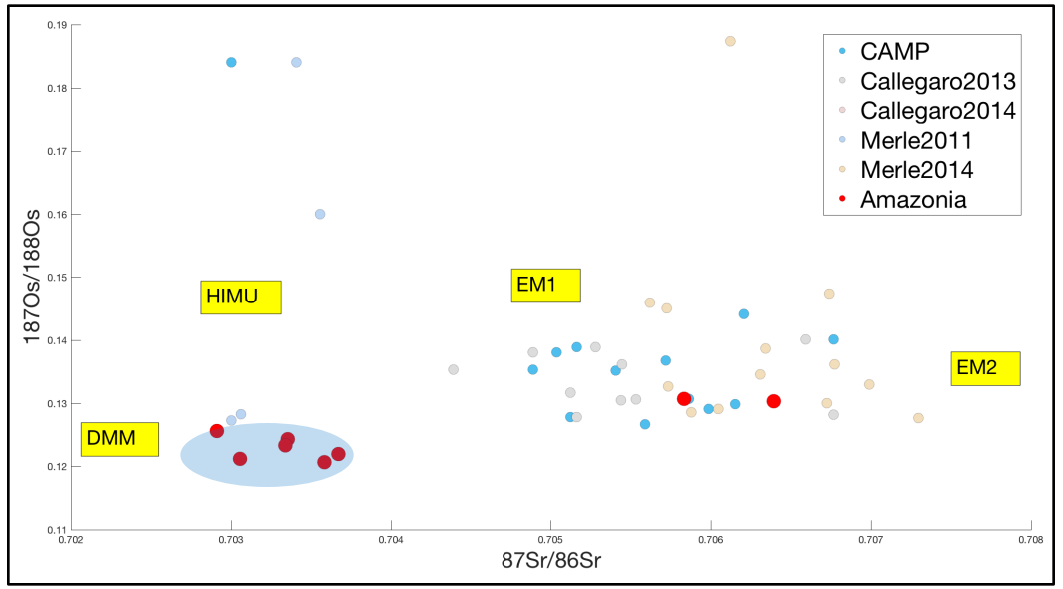
N-TIMS



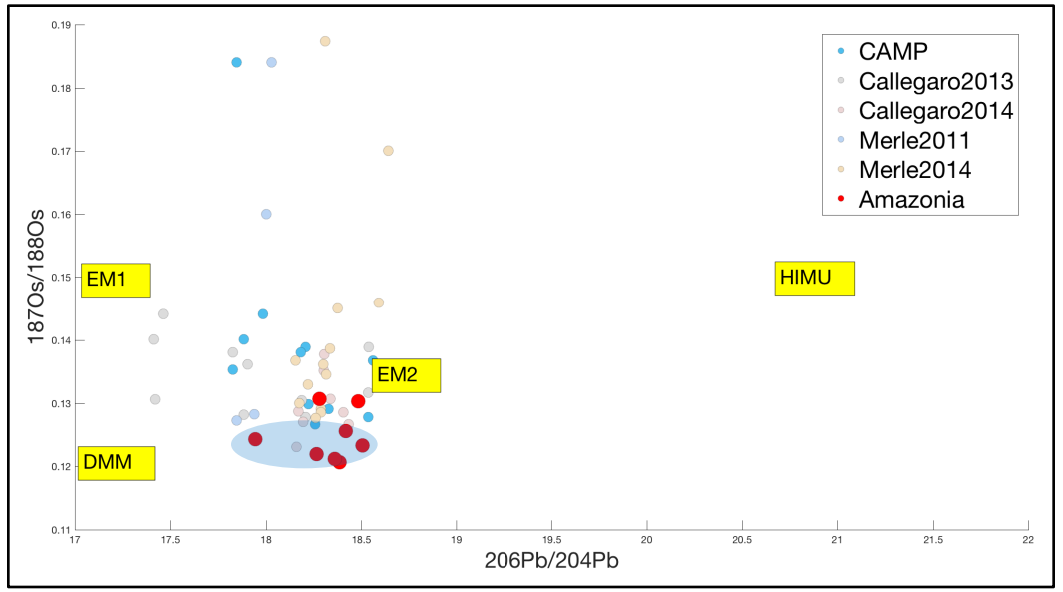
Elaborazione

DATI





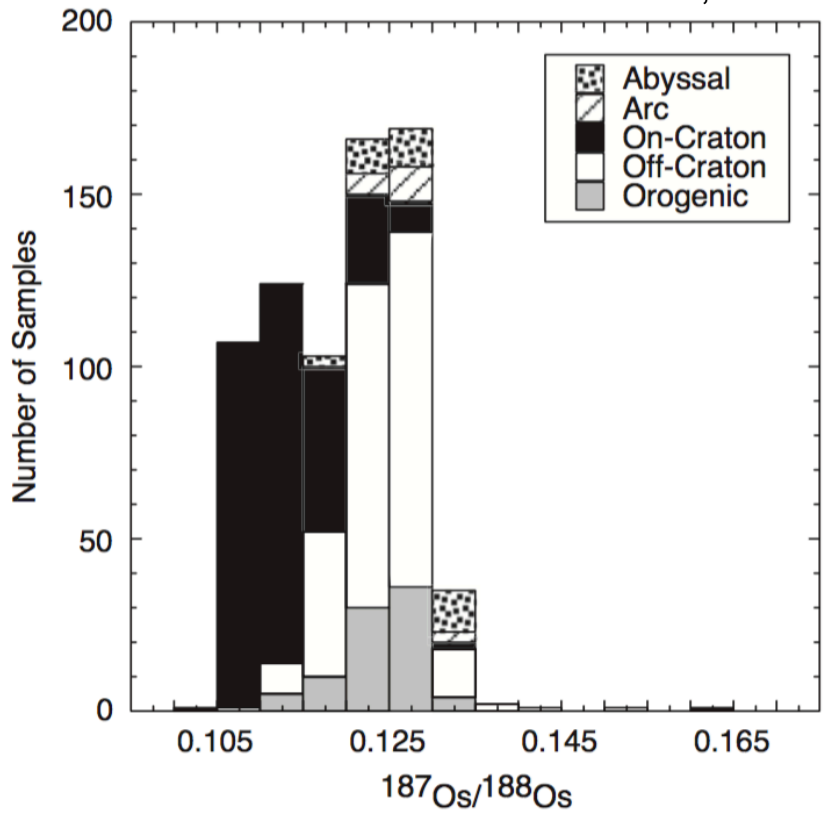
- High-Ti:
  - valori tra i più bassi CAMP
  - $\gamma_{Os} < 0$
  - valori simili al bacino del Maranhao→ confronto

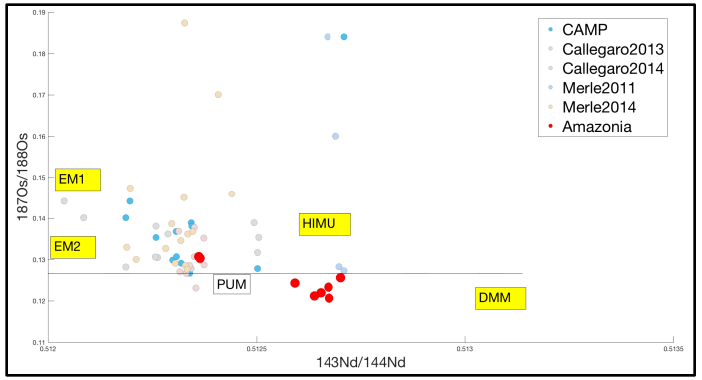


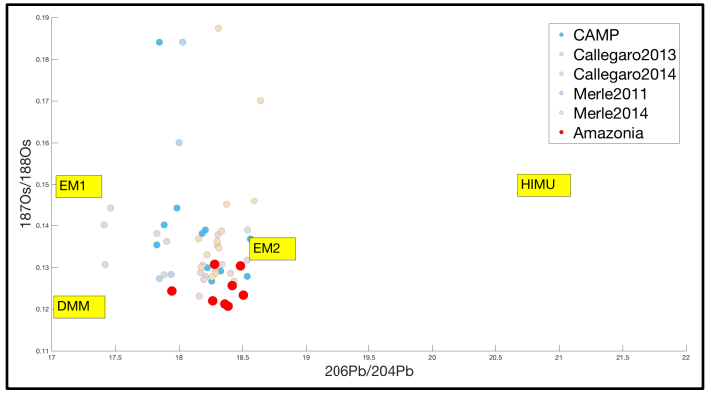
DATI

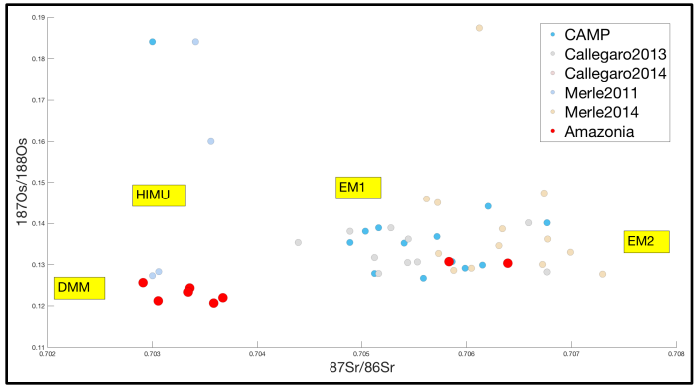
- composizioni tipiche del mantello:
  - **PUM**: 0.128
  - **litosfera** continentale GIOVANE: 0.120-0.130
  - **litosfera** continentale ANTICA: <0.120
  - **CROSTA** proterozoica: 0.6 – 1

Carlson, 2005









CONCLUSIONI

- Quelli trovati sono i **valori più bassi** del rapporto isotopico dell'Os di tutta la CAMP in Amazzonia

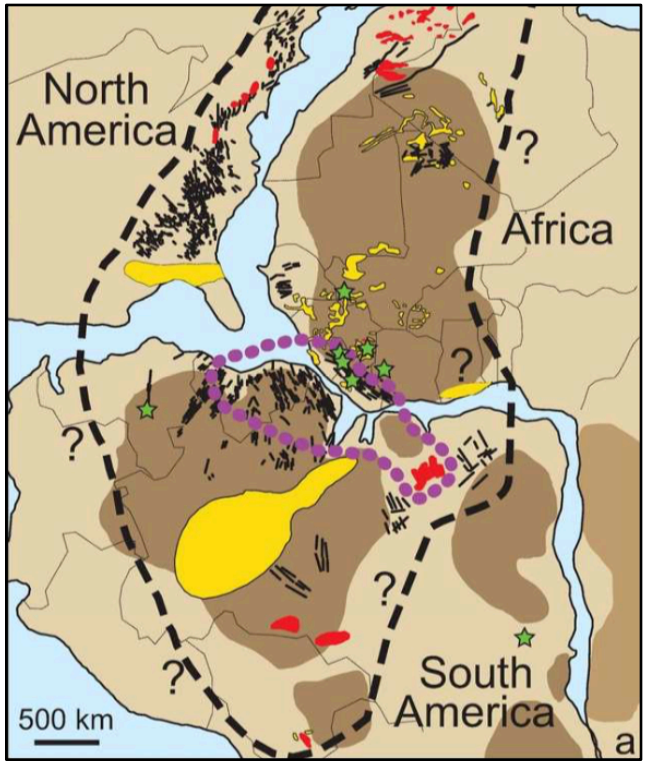
- $^{187}Os/^{188}Os$ tipico di **litosfera**, arricchita da componente astenosferica

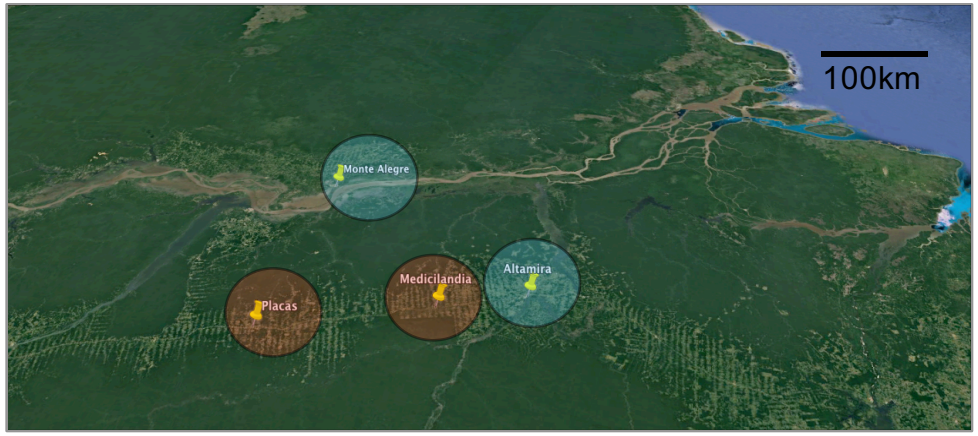
- valori simili relativi a basalti del vicino bacino del Maranhao
  - Nei fusi del bacino del Maranhao invocata **poca assimilazione** (10% AFC)
  - Qui valori $^{187}Os/^{188}Os$ ancora minori → minore assimilazione

- Magmi originati da **litosfera cratonica antica** e, per moti convettivi, venuti a contatto con magmi astenosferici.

- **Diversa localizzazione** tra High-Ti e Low-Ti per vicinanza al limite del cratone e a zone con spessore litosferico eterogeneo

- Fusi originati da litosfera cratonica ricca in solfuri **potenziale causa dell'ETE**





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