

RIO 2018
CONGRESSO BRASILEIRO DE
GEOLOGIA



9º Simpósio do Cárterço do Brasil
Rio de Janeiro - 2018



Processo: 149342/2016-0



Processo: 2015/01817-6

THE INHANDJARA TOPAZ-BEARING LEUCOGRANITE: AN EXAMPLE OF MAGMATIC DIFFERENTIATION IN THE ITU RAPAKIVI PROVINCE

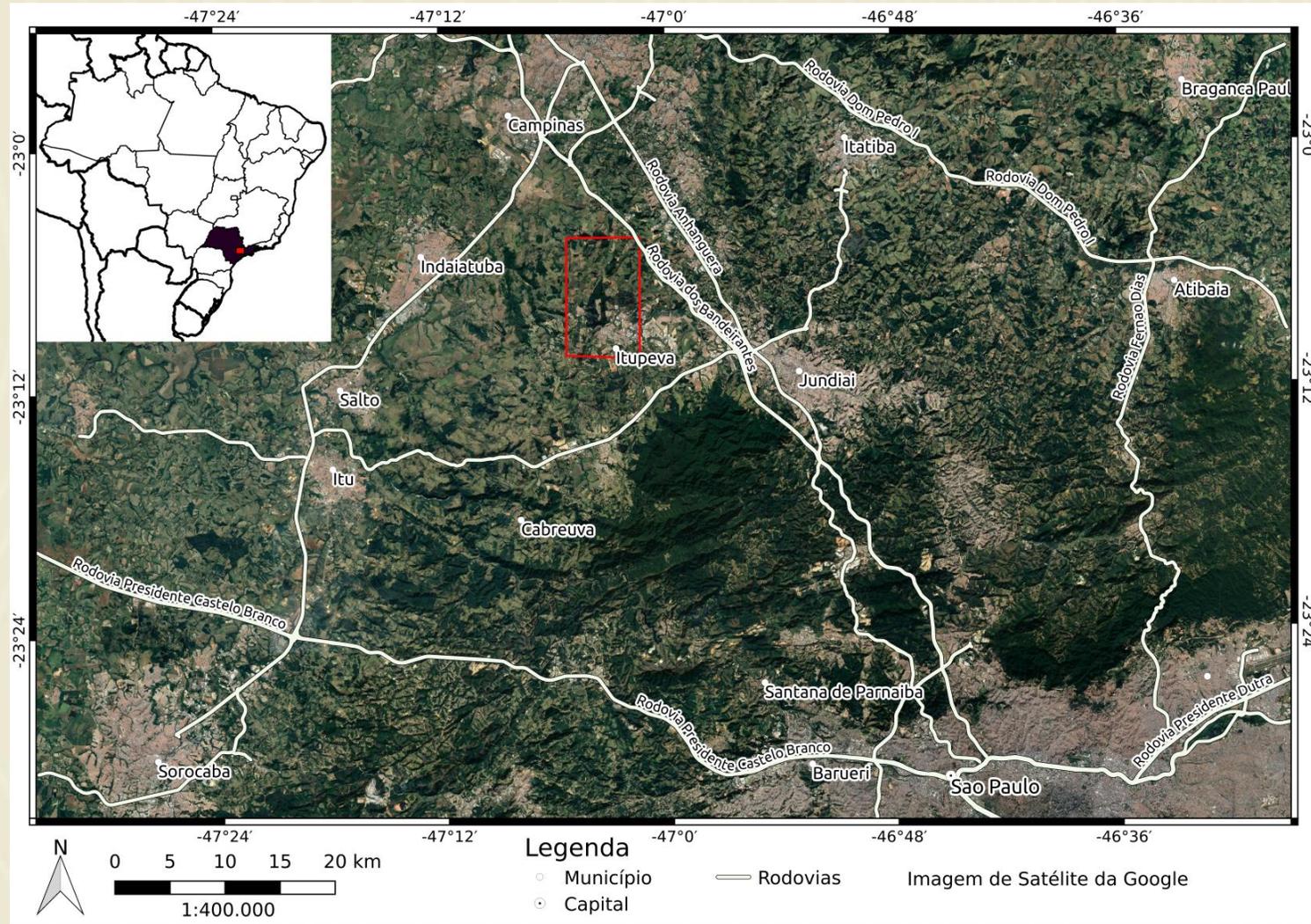
*Araujo, Fernando; Martins, Lucelene; Janasi, Valdecir; Pereira, Giovanna
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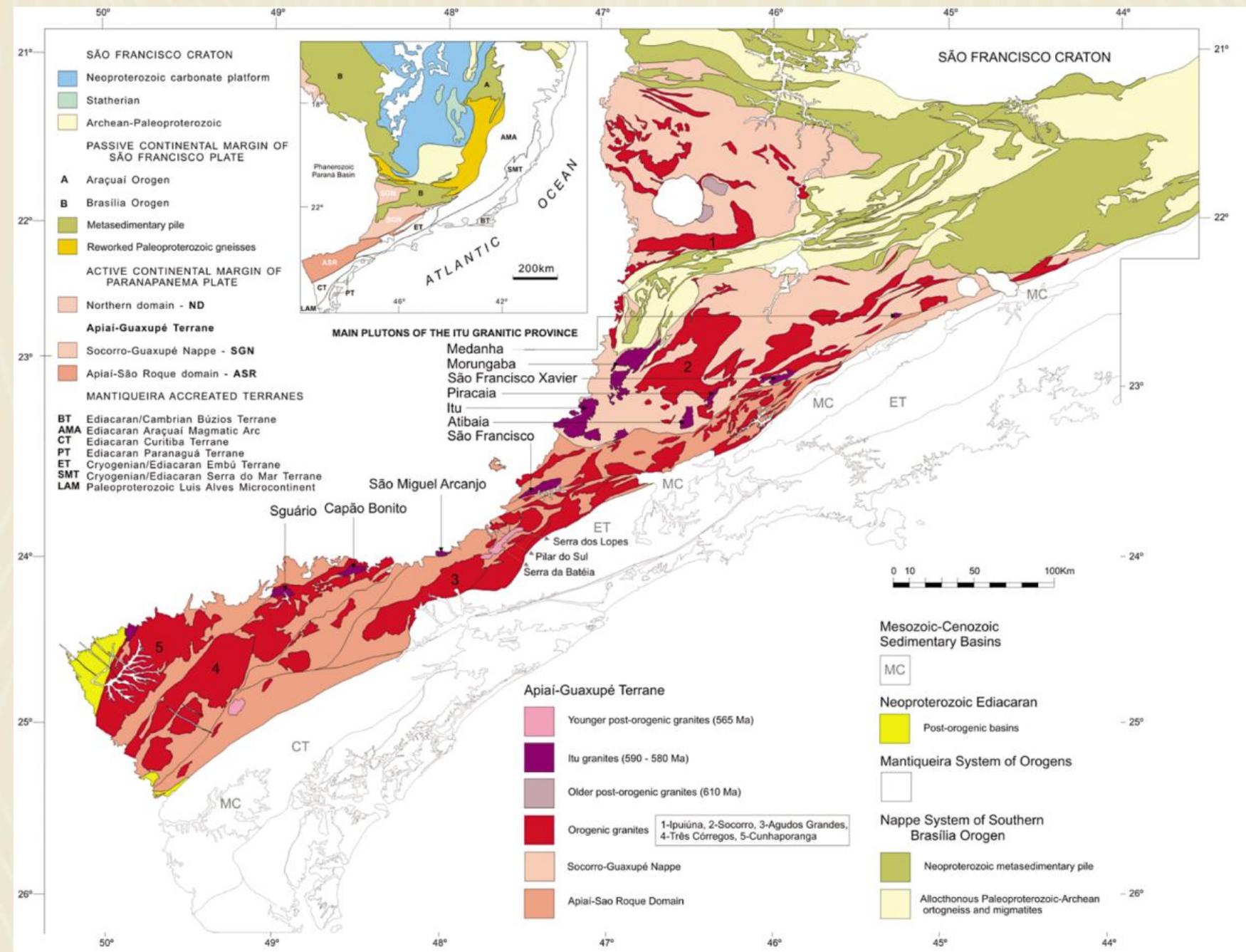
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Introdução

- Localizado a norte da cidade de Itupeva (Estado de São Paulo)
- Previamente agrupado como parte dos Plutons Itupeva e Cabreúva (Pascholati, 1990; Galembeck, 1997; Janasi *et al.*, 2009)
- Resposta radiométrica e geomorfológica distinta dos granitos ao lado



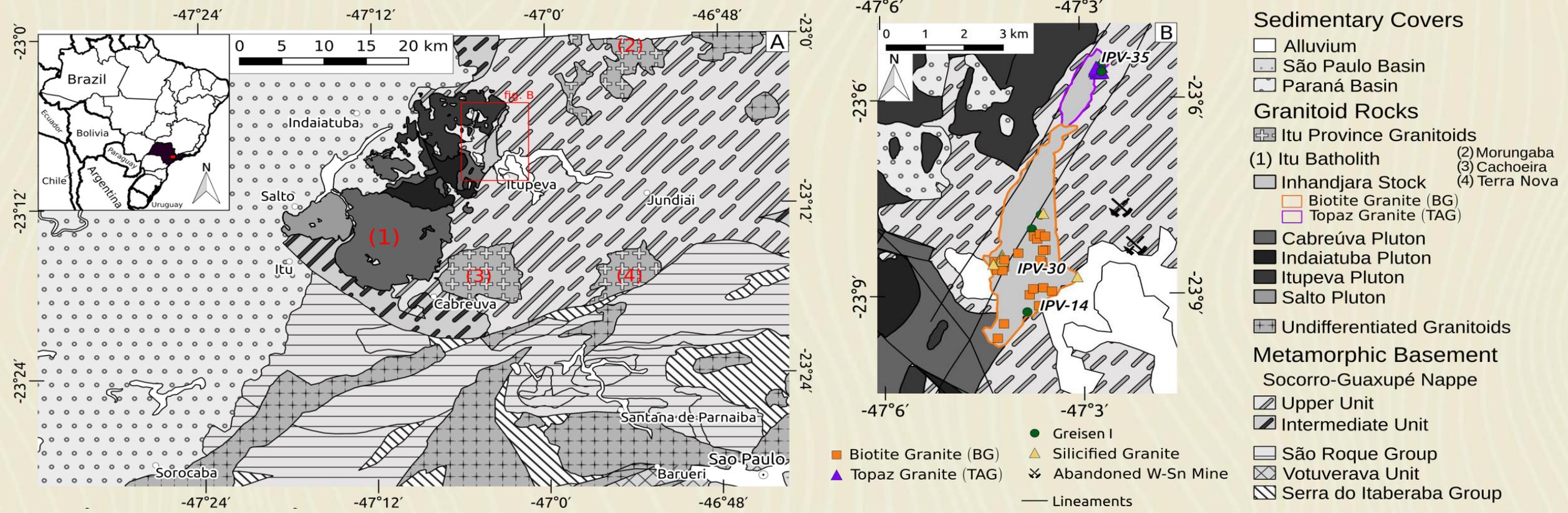


PROVÍNCIA GRANÍTICA ITU

Janasi *et al.* (2009)

Batólito Itu

- Corpo pós-colisional tipo-A
- Ediacarano (590-580 Ma – Janasi *et al.*, 2009)
- Granitoides majoritariamente oxidados e álcali-cálcicos (Janasi *et al.*, 2009)
- Textura rapakivi e evidências de mistura com magmas máficos



O Leucogranito Inhandjara

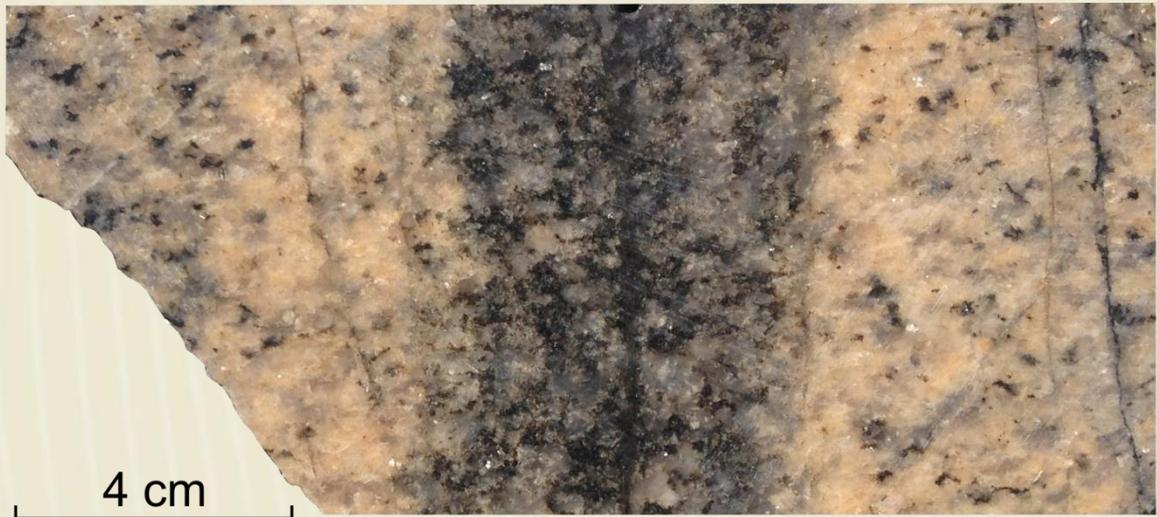
- Biotita Granito
 - Varia texturalmente entre fácies porfirítica e inequigranular
- Topázio Granito
 - Equigranular médio a fino



TOPÁZIO GRANITO

- Álcali-feldspato granito ($M' = 2$ a 4%)
- Fases magmáticas acessórias: biotita, fluorita, topázio, ilmenita e columbita
- Minerais secundários: muscovita, clorita e bastnasita (carbonato de ETR)
- Presença de corpos irregulares de leucogranito fino e bolsões pegmatíticos





4 cm

Granito Fresco

Veio

Ms + Chl

Granito Fresco

Ms + Qtz

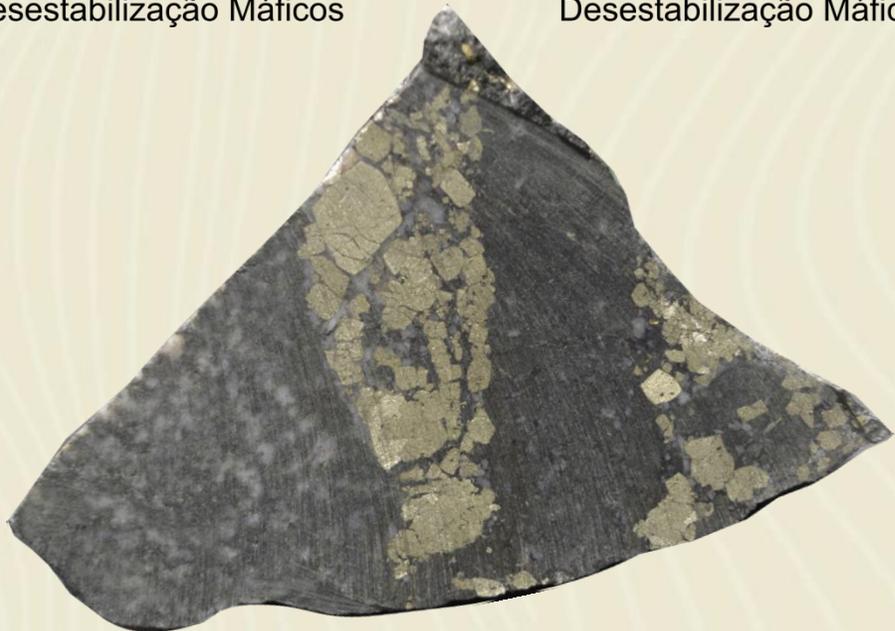
Greisen

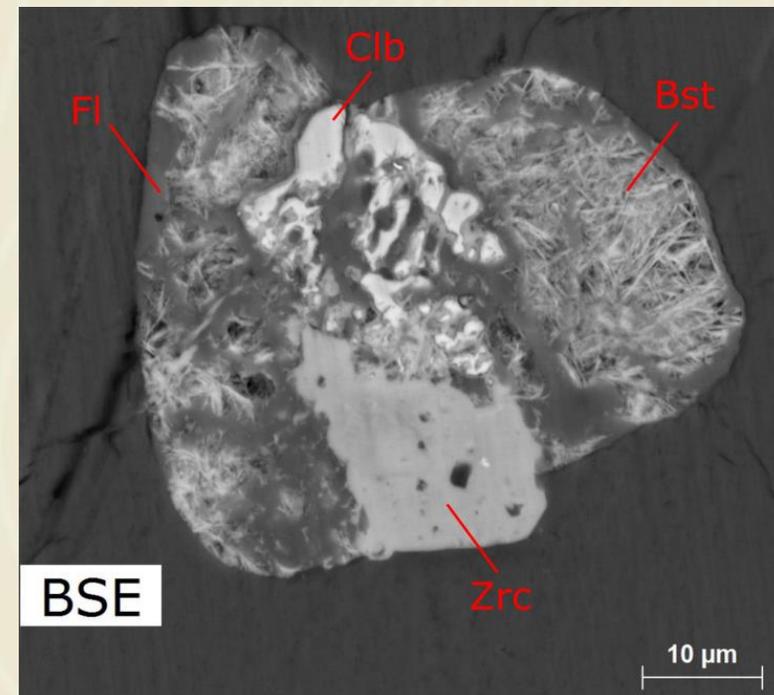
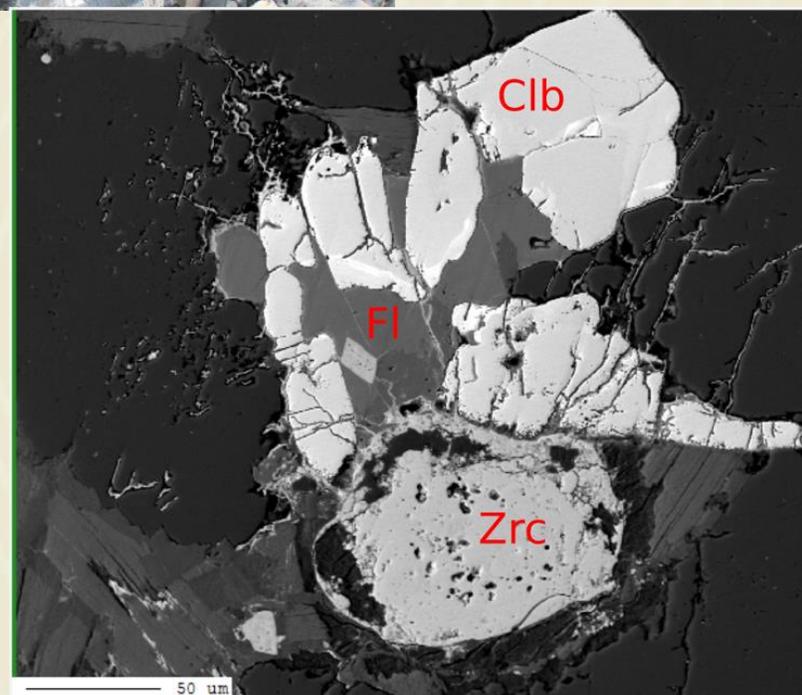
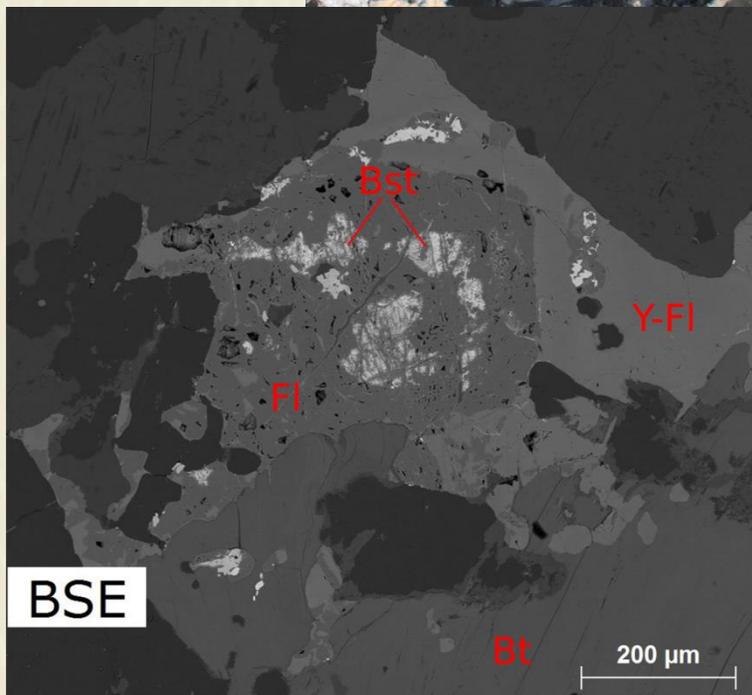
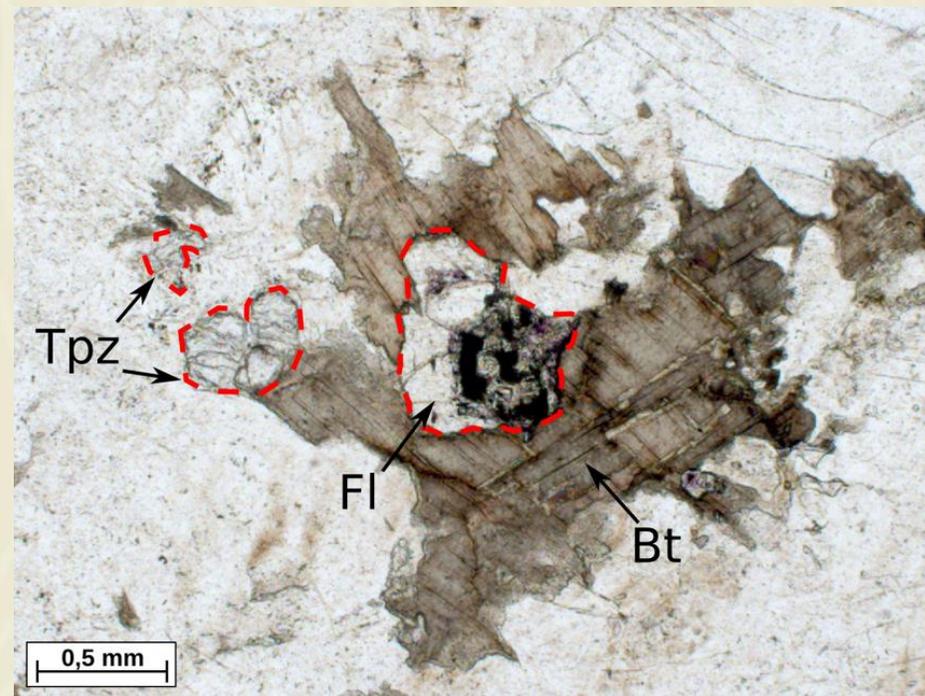
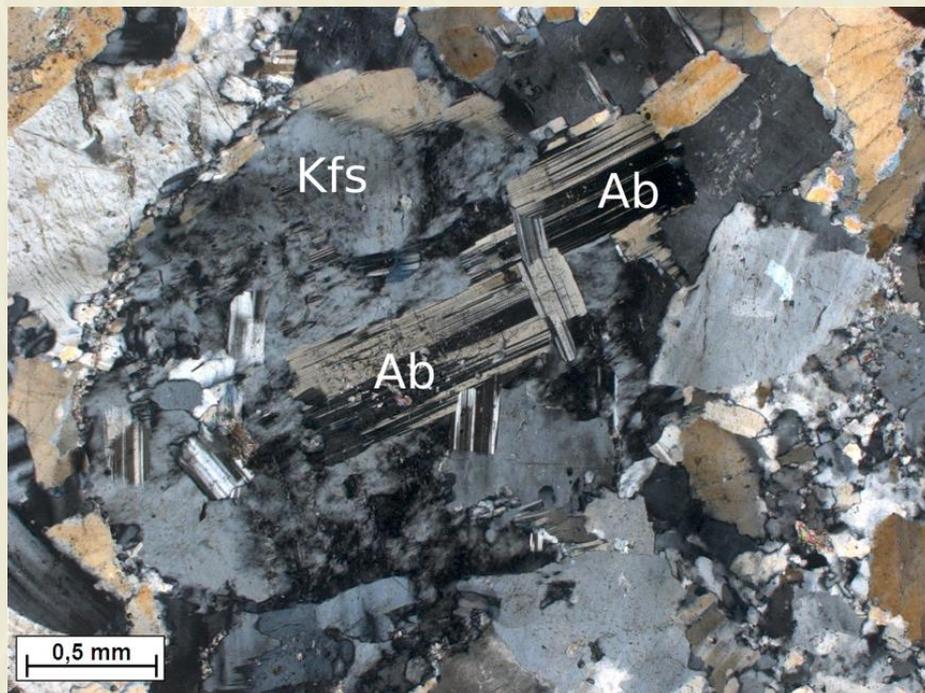
Ms + Qtz

Greisen

Albitização +
Desestabilização Máficos

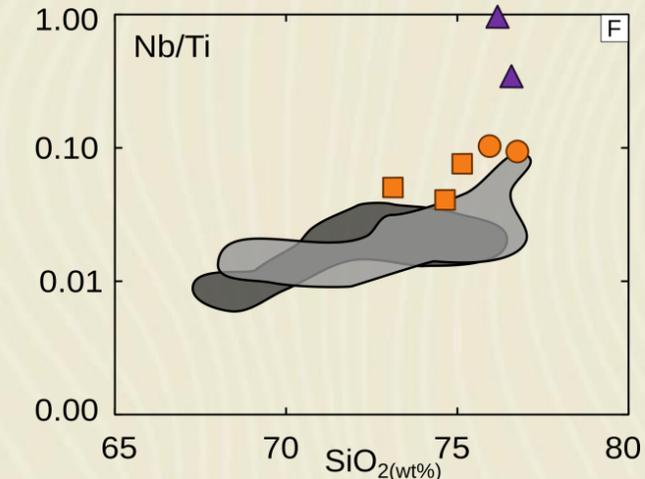
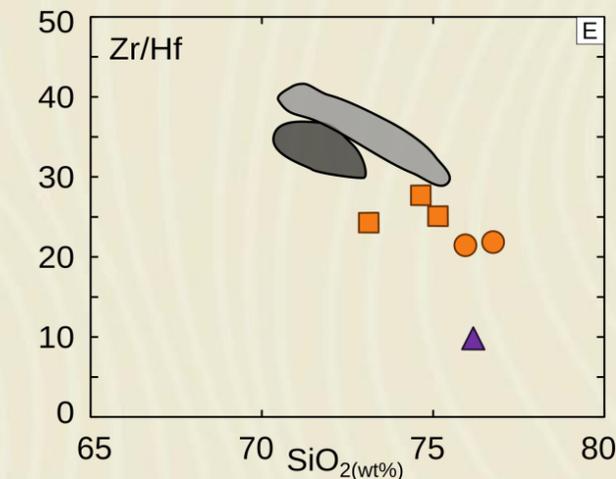
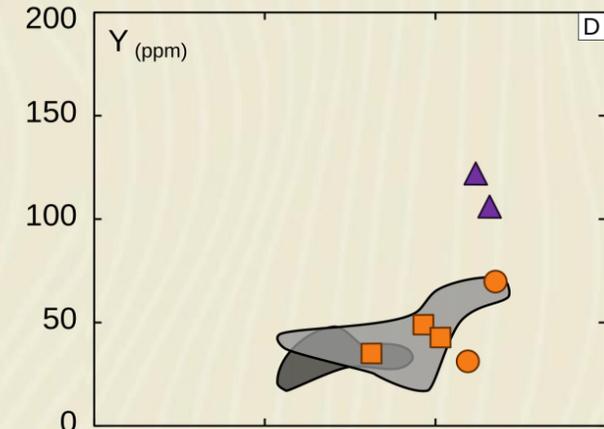
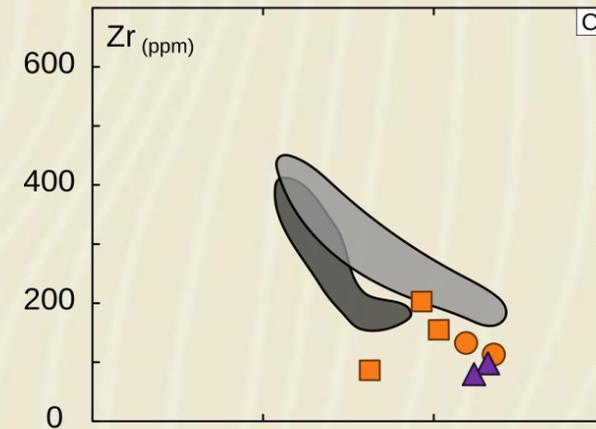
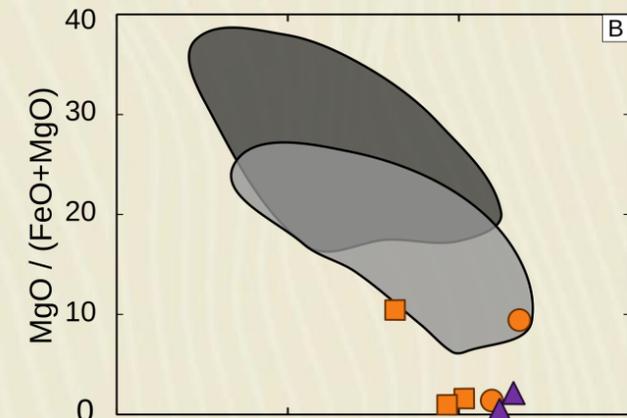
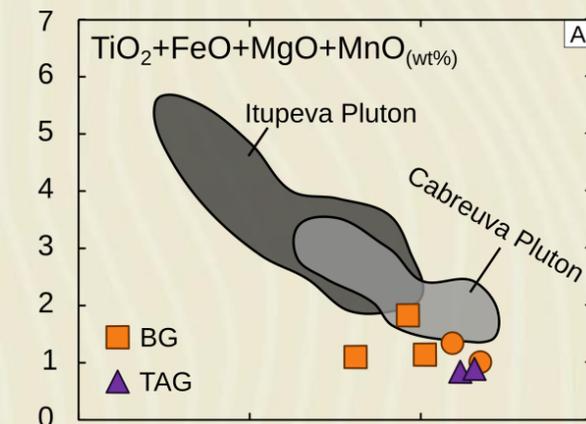
Albitização +
Desestabilização Máficos



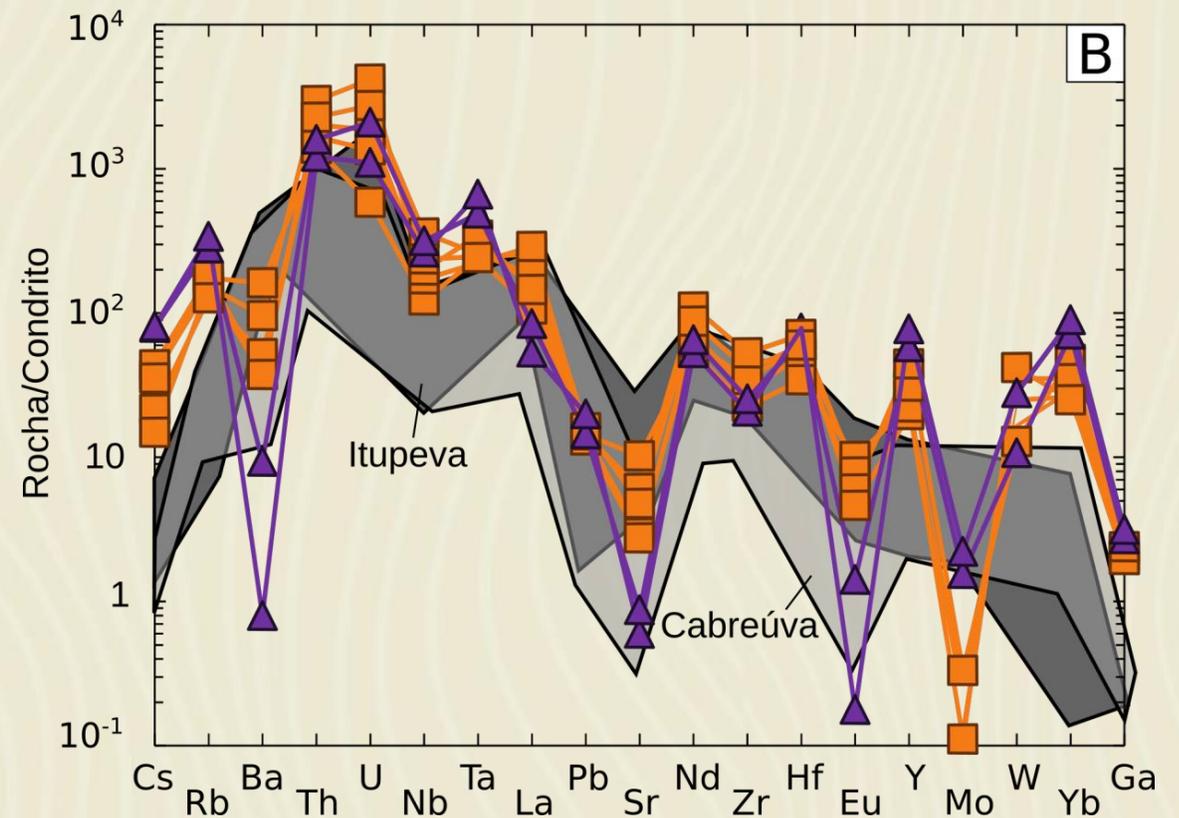
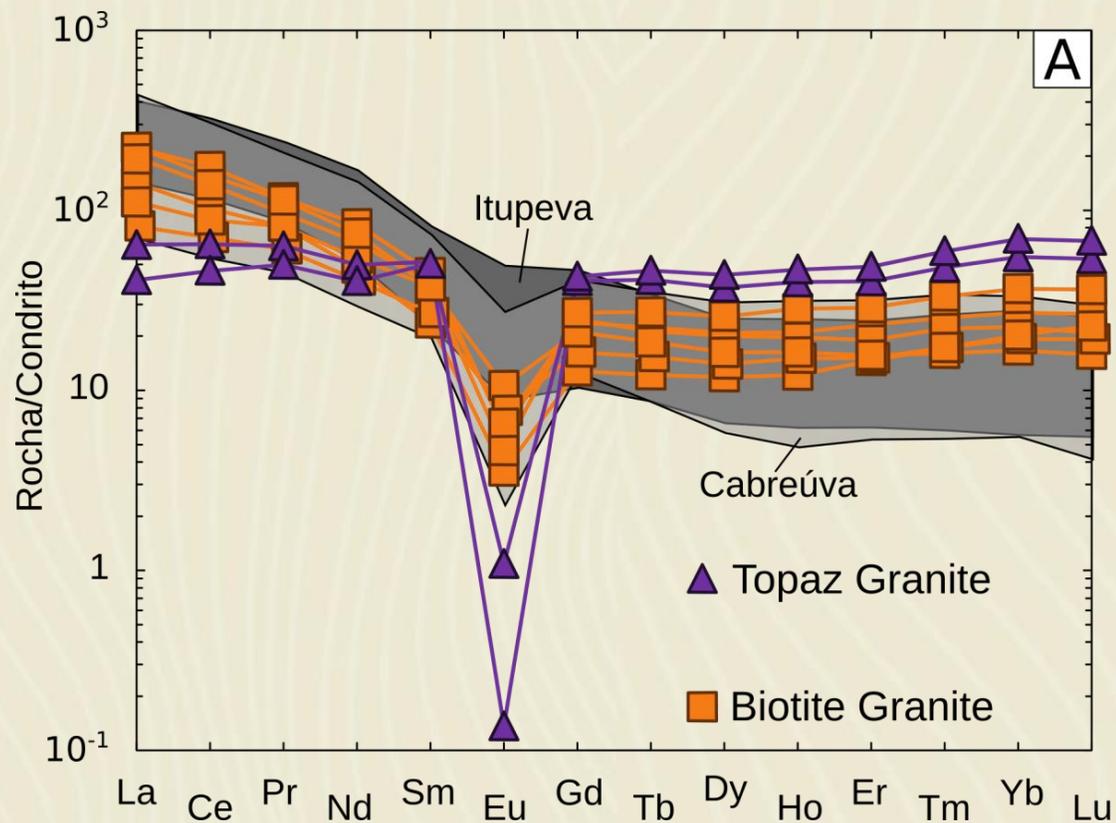


Geoquímica de Rocha Total

- Granito tipo-A reduzido, subtipo-A2
- Metaluminoso a levemente peraluminoso (ASI = 0.97 a 1.05)
- Ferroano ($Fe^* = 0.99$ a 1.00)
- Álcali-cálcico (MALI = 7.53 a 8.74)
- Maiores teores de SiO_2 , álcalis e elementos incompatíveis
- Baixo conteúdo de TiO_2 , FeO_T , MgO , CaO e P_2O_5
- Aumento de F, Rb, Cs, Y e Nb, com diminuição em Zr, Sr e Ba do Biotita Granito para o Topázio Granito

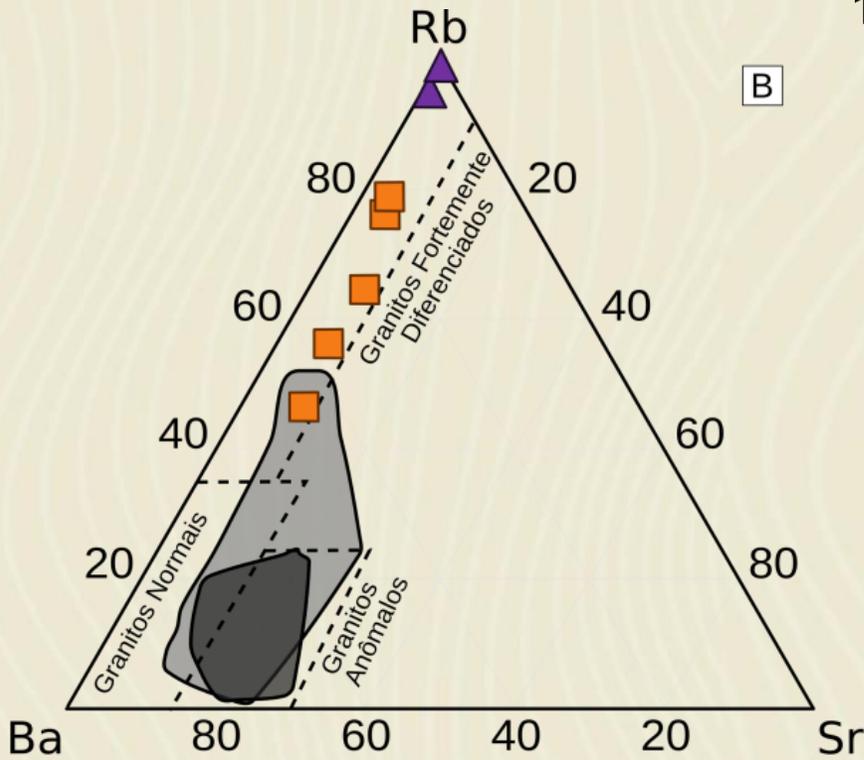


- Biotita Granito: maior conteúdo de ETRL – $(La/Yb)_N = 3$ a 8.2
- Topázio Granito: maior conteúdo de ETRP – $(La/Yb)_N = 0.6$ a 1.2
- Forte anomalia negativa de európio – $Eu/Eu^* = 0.003$

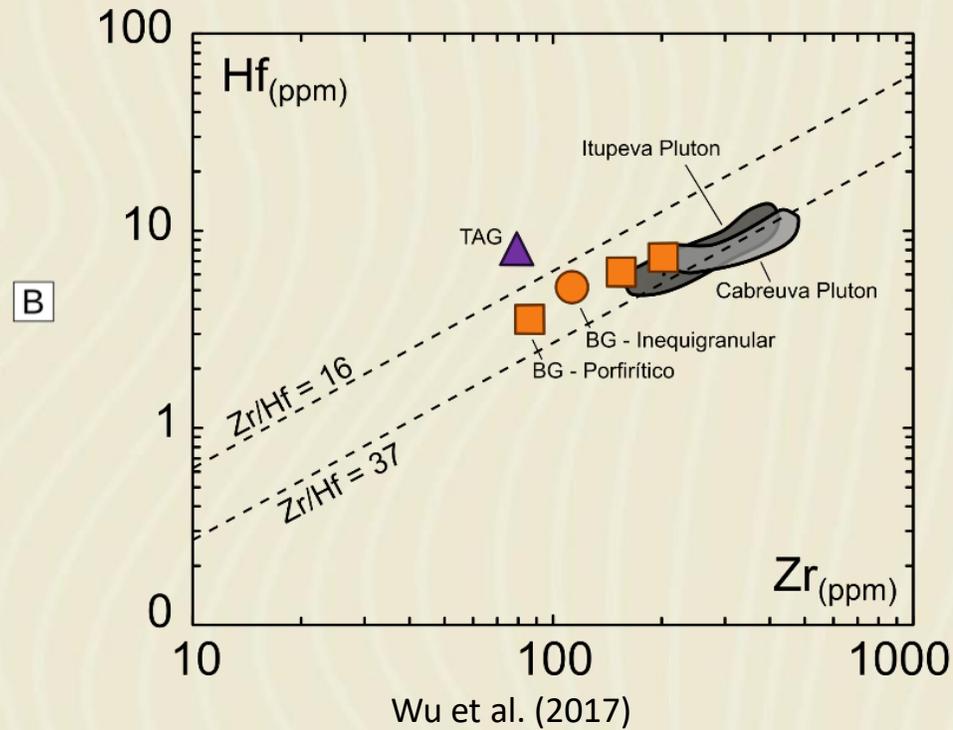


Diferenciação Magmato-Hidrotermal

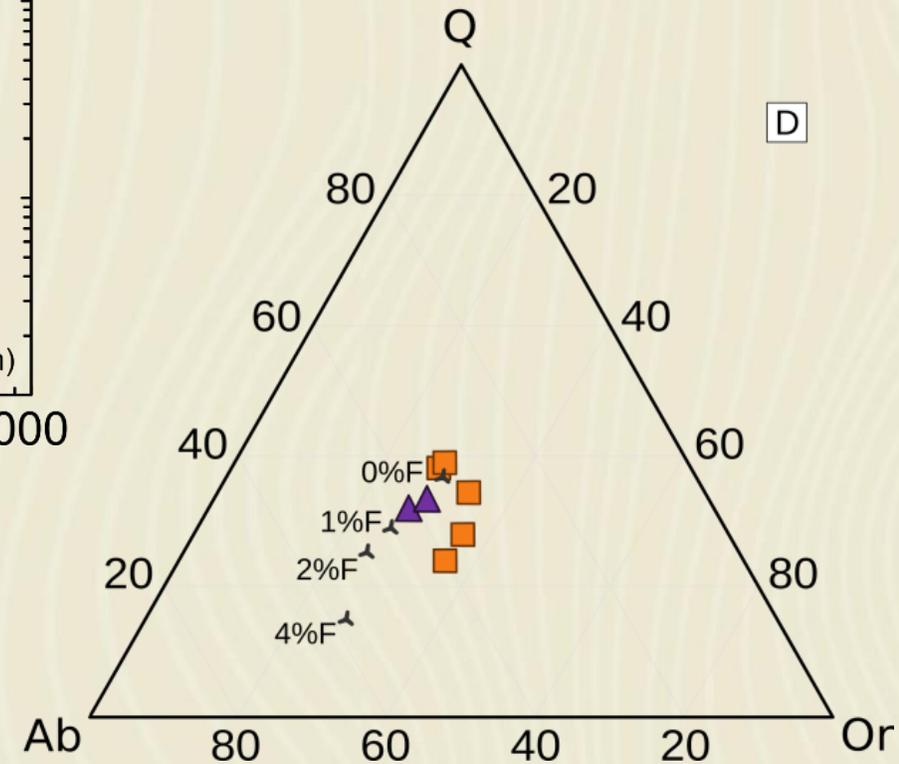
- \uparrow Rb com \downarrow Ba e Sr – Fracionamento Extremo
- Zr/Hf variável



El Bouselly e El Sockary (1975)



Wu et al. (2017)

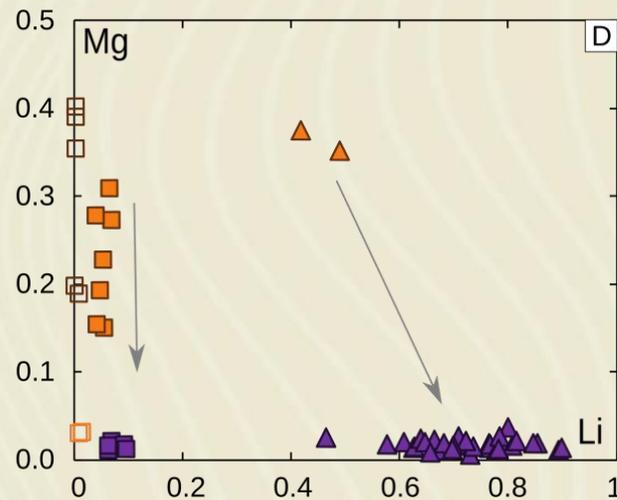
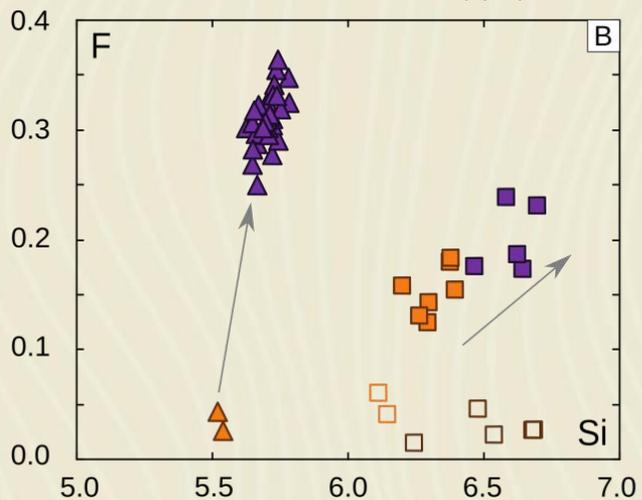
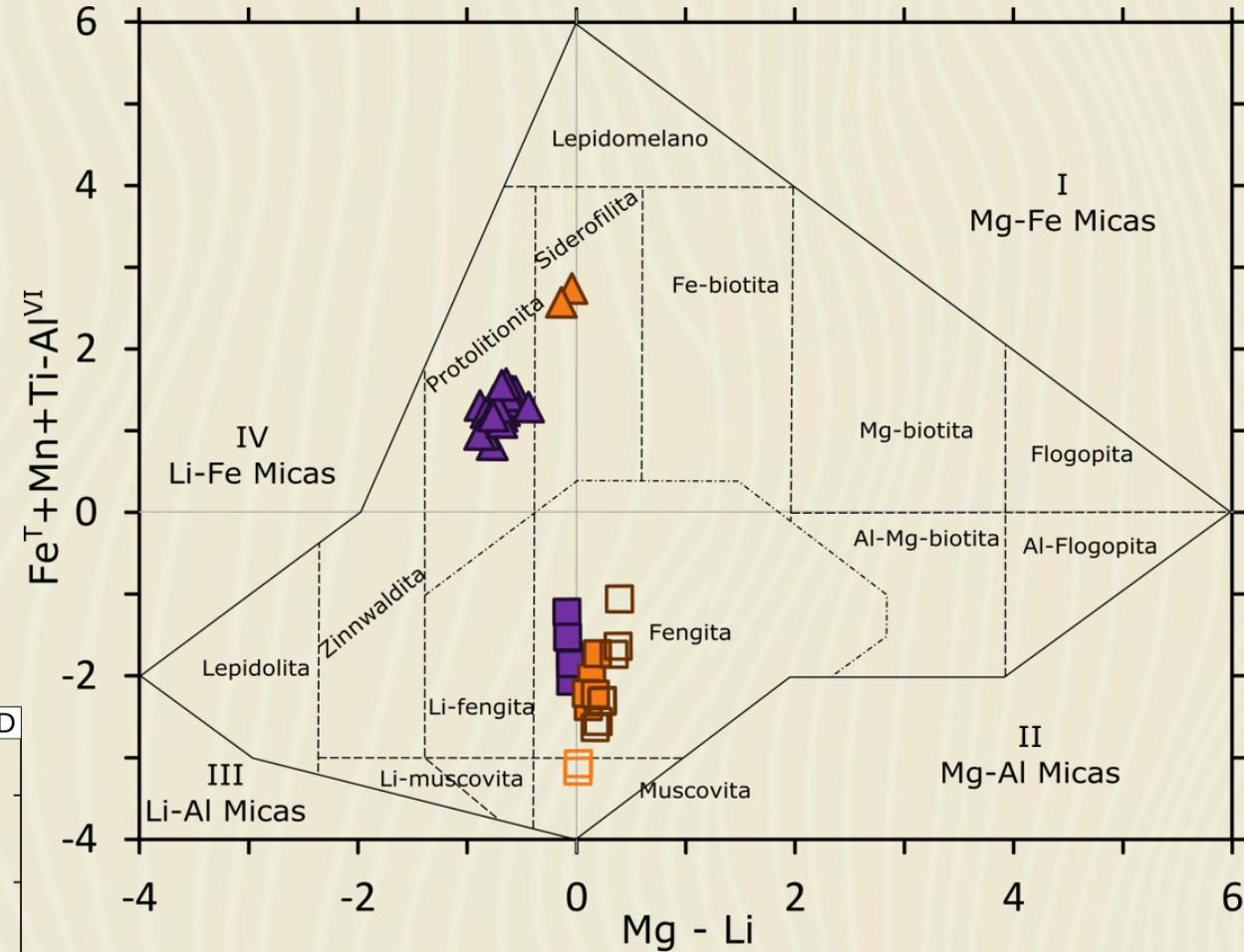


Manning (1981)

Química Mineral - Micas

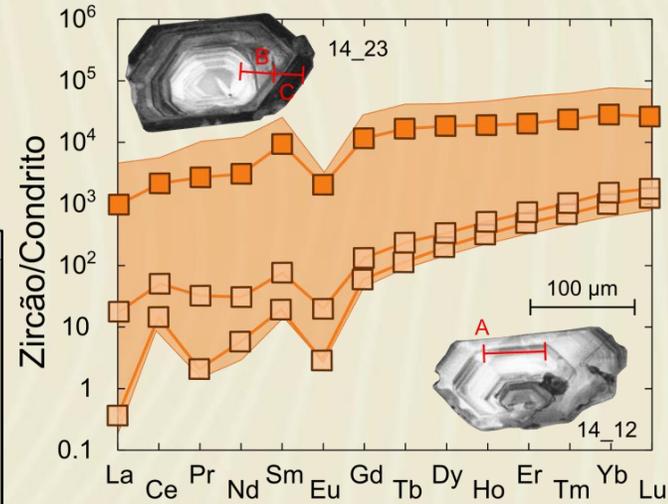
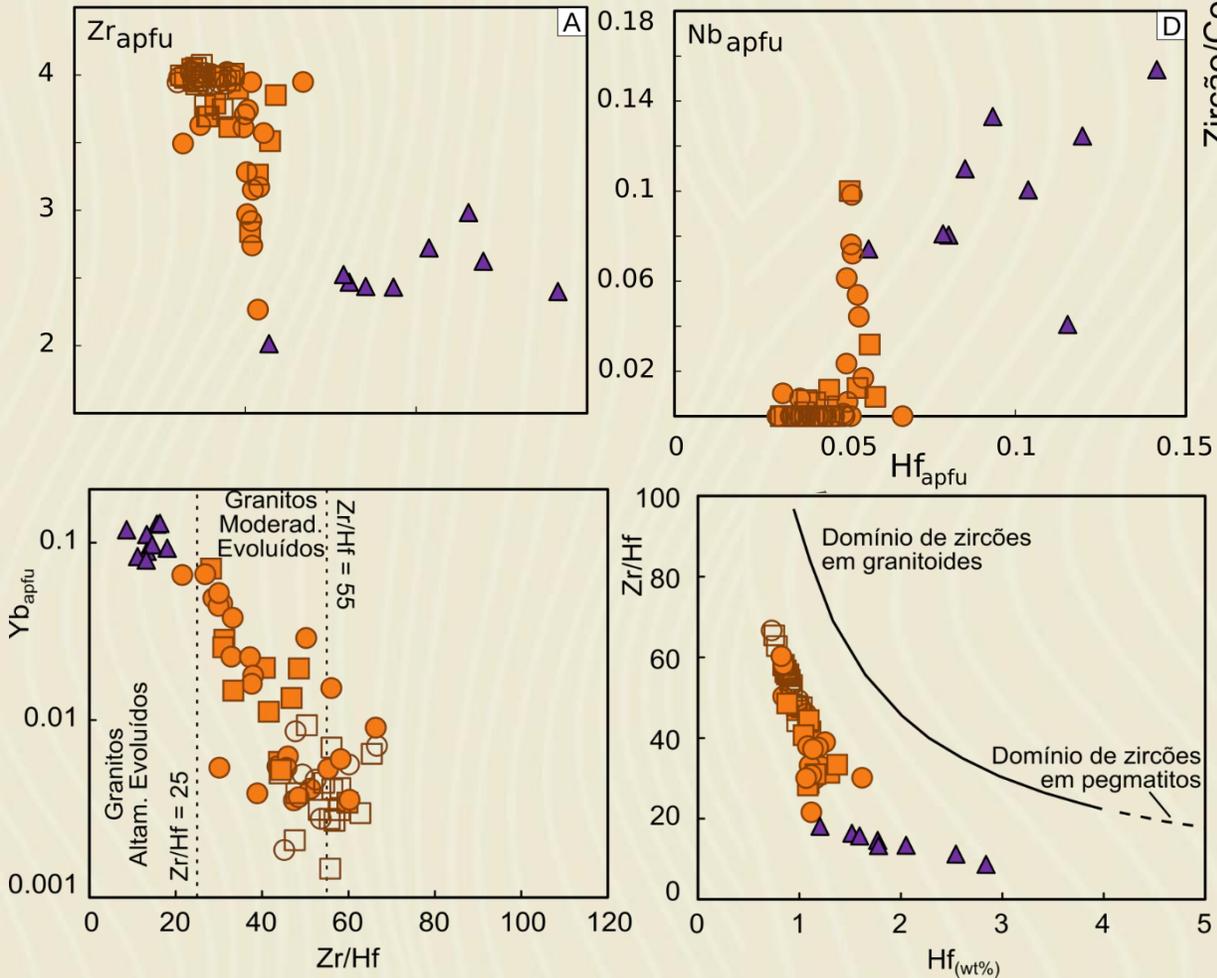
- Baixa variação dentro de cada amostra
- Certa tendência evolutiva
- Biotita do TAG apresenta maior conteúdo de F, Li e Al^VI , e pouco Mg, Fe e Ti

Tischendorf *et al.* (1997)



Química Mineral - Zircão

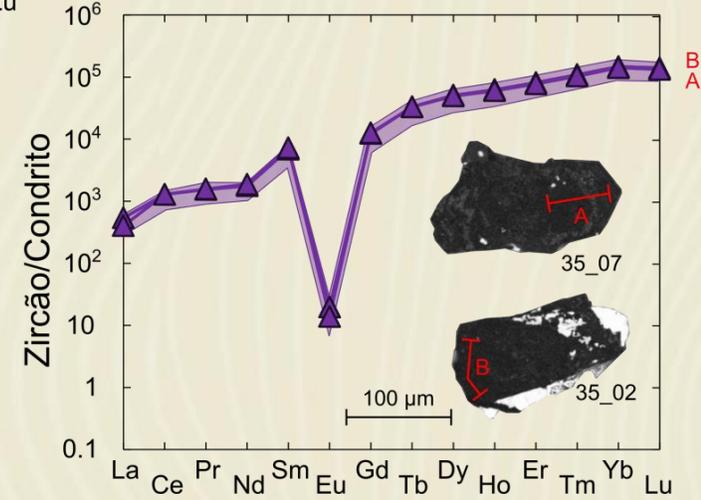
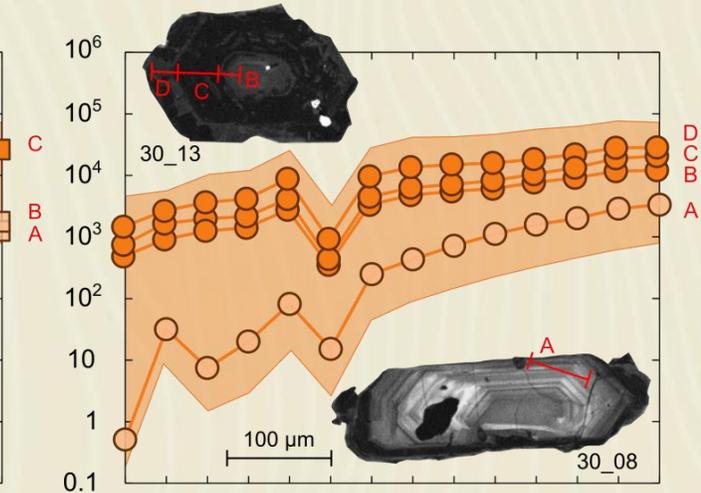
- Variações entre núcleo e borda no BG
- Claras tendências evolutivas



Biotita Granito Porfiritico
 ■ Zonas escuras zonamento fraco
 □ Zonas claras zonamento fino

Biotita Granito Inequigranular
 ● Zonas escuras zonamento fraco
 ○ Zonas claras zonamento fino

Topázio Granito
 ▲ Zonas escuras zonamento fraco



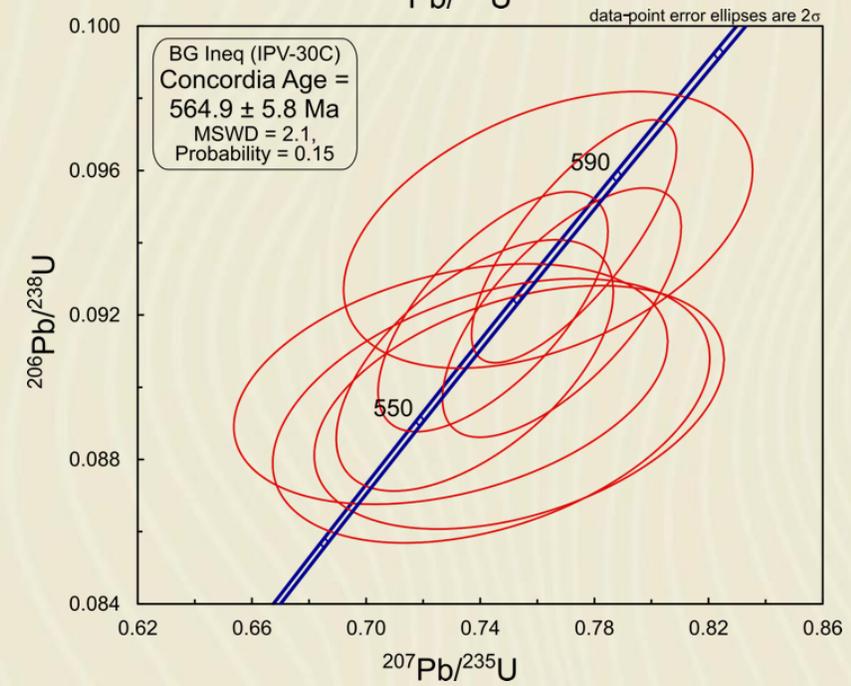
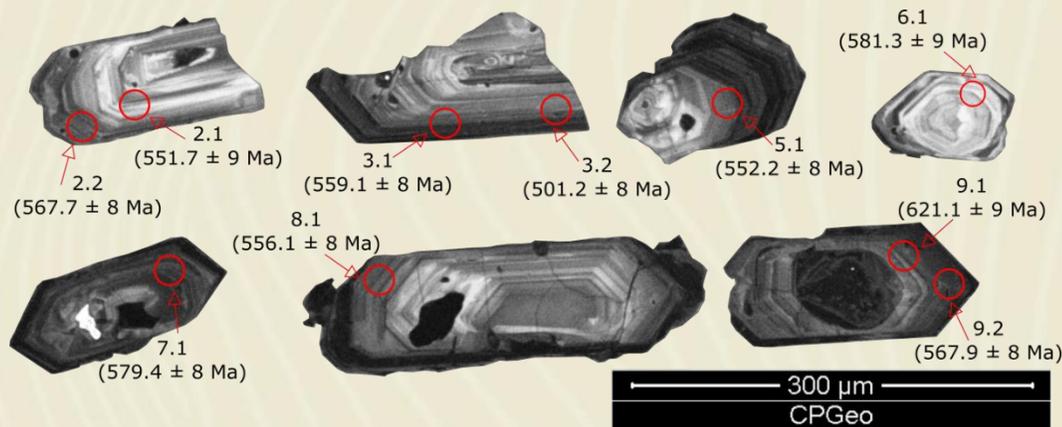
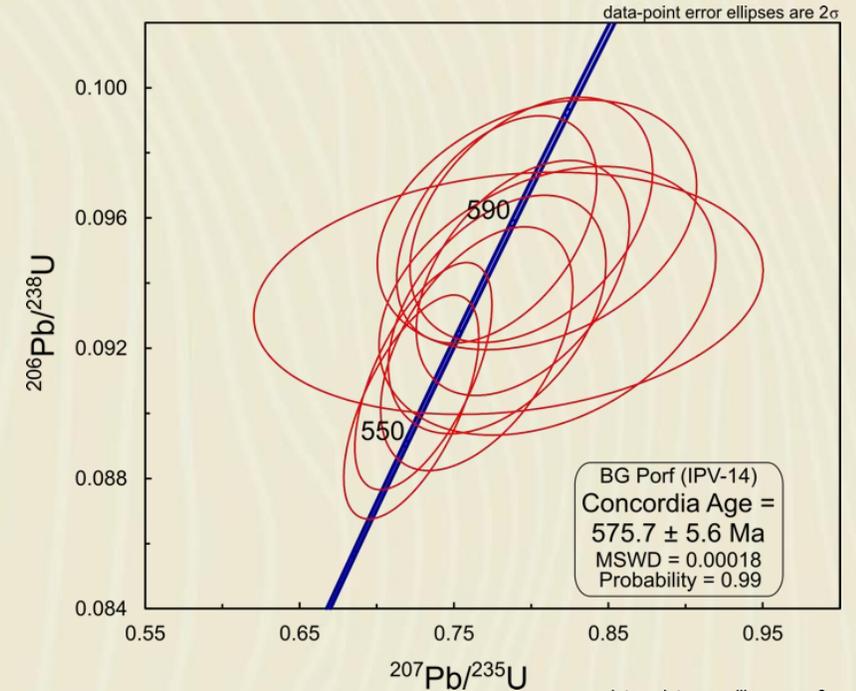
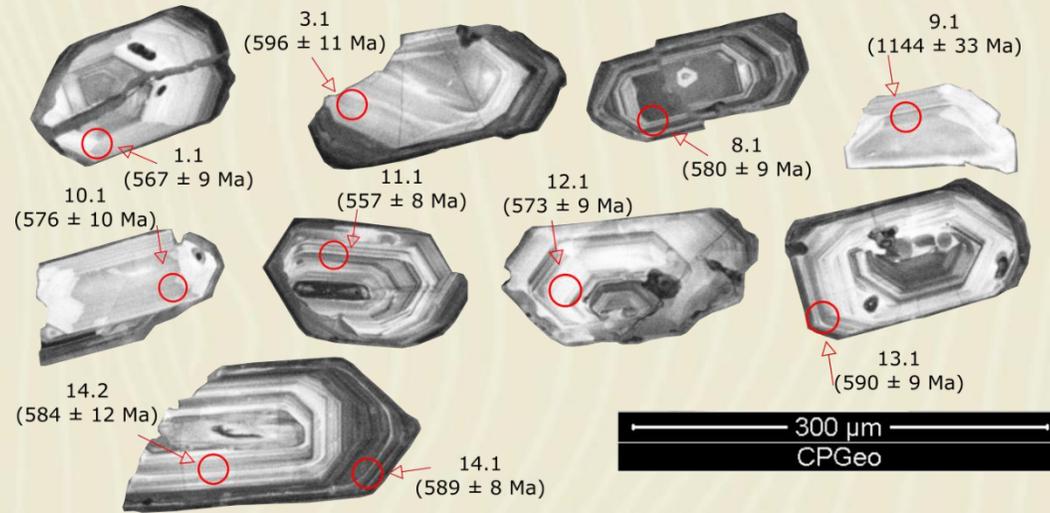
Limites Zr/Hf de Breiter et al. (2014).

Domínios conforme Raimbault et al., (1995) e Wang et al. (2000) (

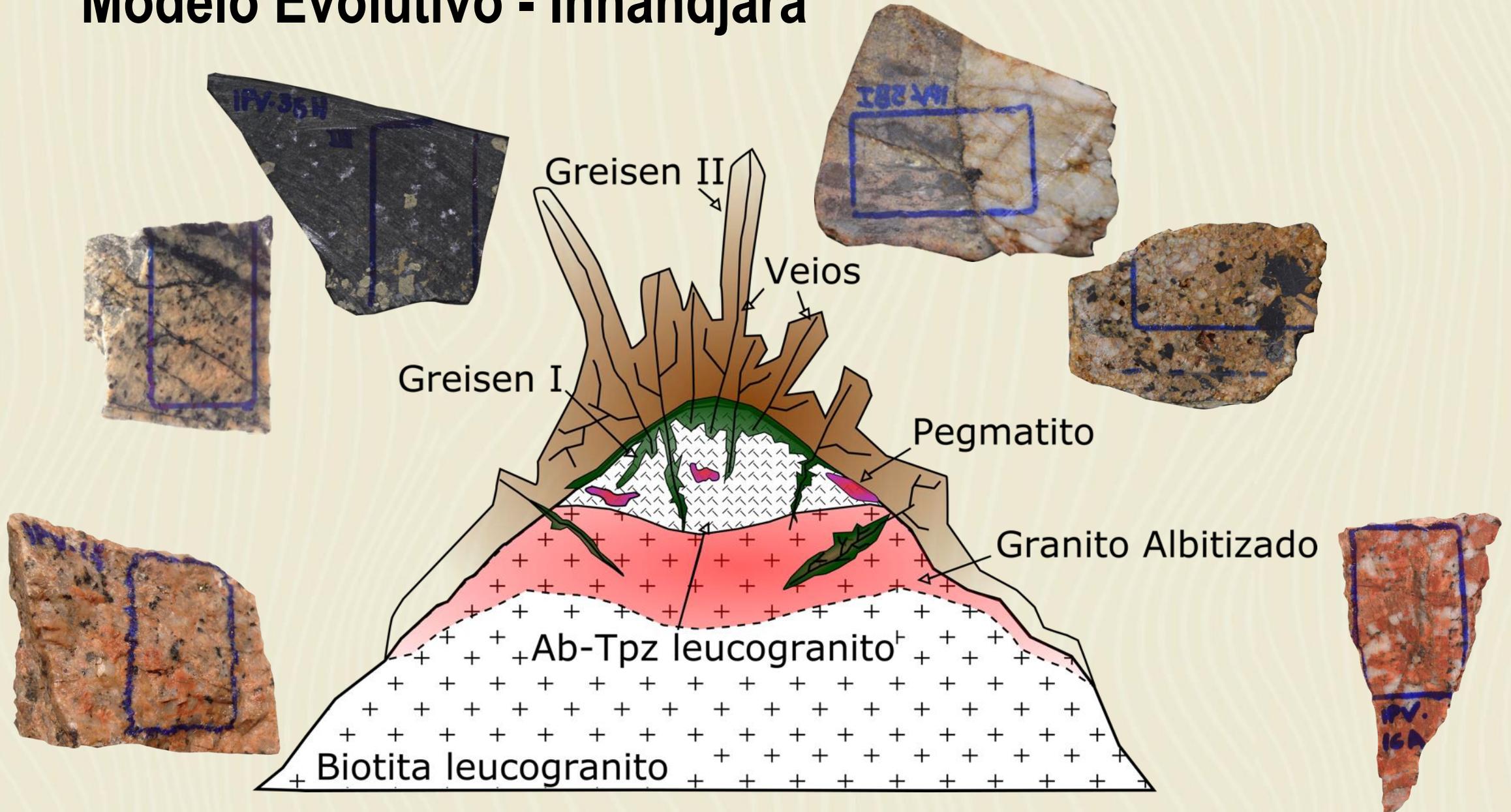
Datação U-Pb (SHRIMP)

- Ediacarano

- 575 a 565 Ma



Modelo Evolutivo - Inhandjara



Modelo esquemático para o Stock Inhandjara. Conforme Lehmann (1990) e Pirajno (2013).

Conclusões sobre o Leucogranito Inhandjara

- É um *stock* satélite ao Batólito Itu, distinto dos Plutons adjacentes
- Compreende duas unidades principais: Biotita Granito inicial e Topázio Granito tardio
- Intenso metassomatismo alcalino e greisenização (associada a minerais sulfetados)
- Presença de fases magmáticas evoluídas: Ab, Li-Bt, Fl, Tpz, Zrc rico em ETR, e Clb
- Granito tipo-A reduzido, enriquecido em elementos incompatíveis
- Alto conteúdo de ETR, especialmente ETRP, e forte anomalia negativa de Eu
- Cristalizado durante o Ediacarano (ca. 570 Ma), similar ao intervalo do Batólito Itu
- Representa um magma residual, altamente diferenciado e evoluído