Timing for the Jacurici magmatism and its implication for chromite deposit formation, Brazil

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The Brazilian largest chromite deposit is hosted in a Paleoproterozoic mafic-ultramafic swarm of layered bodies, possible fragments of a single larger sill disrupted during deformation. The Jacurici Complex outcrops in a N-S trending (70 km-long to 20 km-wide) parallel to a large syenite intrusion in the NE of the São Francisco Craton. The sill is just 300 m thick whereas the ore occurs in a single 5-8 m thick massive layer posing huge problems considering mass balance [1] [2]. At the northern part, Ni-Cu sulfide mineralization also occurs at the same stratigraphic level. Re-Os dating [3] suggested that the complex was older than reported before [4]. Zircons separated from a norite belonging the Complex and an undeformed alkaline pegmatite that crosscuts the mafic-ultramafic rocks point to a very short interval of time between crystallization, deformation and intrusion of the syenite (table 1). Marques *et al*. [2] suggested that chromite crystallization was triggered by crustal contamination and a high volume of magma flowed through the sill acting as a dynamic conduit leaving chromite behind. Although the Jacurici chromitites formation shows reasonable aspects to consider the *in situ* model [1] [2], it is difficult to reconcile the crystallization conditions to the thickness observed in the short timing assumed for the magmatism. The chromite-rich slurry transportation [5] [6] could be an alternative possibility, although the small size of the complex precludes mush mobility [cf.6].

Rock/mineral	Method	Age	Ref.
Jacurici gabbro	U-Pb zircon SHRIMP	2085±5Ma	4
Itiúba Syenite		2084±16Ma	
Remobilized sulfide in veinlets	Re-Os	2084±1Ma	3
Pegmatites that crosscut the Complex	U-Pb zircon LA-MC-ICP-MS	2084±6Ma	this study
Jacurici norite		2099±3Ma	

Table 1: Ages for the Jacurici Complex area

[1]Marques & Ferreira Filho (2003) *Econ. Geol.* **98**, 87-108. [2] Marques *et al.* (2003) *J. Petrol*. **44**, 659-678. [3] Marques & Carlson (2008) Geoch. Cosmoch. Acta, suplem.,**72**, A 593. [4] Oliveira *et al.* (2004) *Precamb. Res*. **128**, 143-165. [5] Voordouw *et al.* (2009) *Mineral.Petrol.* **97**,75–94. [6] Maier *et al.* (2013) **48**, 1-56.