ABSTRACTS

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Isotope geology applied to sedimentary successions: the case of the Bambuí Group, São Francisco Basin, Brazil

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Isotope techniques have been widely applied to help understanding the evolution of sedimentary basins, including provenance of the sediments, age of deposition, and timing of post-depositional alterations, as well and to decipher the variations of the seawater chemistry. This is mostly important on Precambrian rocks when fossil record is poor.
Here we present data on the Neoproterozoic São Francisco basin, deposited on the São Francisco Craton, Brazil. This basin contains a basal glacial diamictite which age is still disputable. U-Pb detrital zircons older than 875 Ma suggest a Sturtian age for these sediments and this interpretation is supported by and Pb-Pb isochron age of 740 ± 22 Ma obtained on a cap carbonate of the Bambuí Formation, which overlies the glacial deposits. Based on these data, the rest of the sedimentary succession has been interpreted as Neoproterozoic. In addition, C and Sr isotope ratios determined on the carbonates were used for chemostratigraphy basin global correlations. However, recent U-Pb ages obtained on an expressive detrital zircon population from the lowermost formation of the Bambuí Group indicate that the maximum depositional age is 560 Ma, suggesting an unconformity, which has not been found in the field. Moreover, the index fossil Cloudina was also recently found in the lower part of the succession confirming the U-Pb ages on detrital zircons. The Sr isotopic ratios recorded on the carbonates show large variations, ranging from 0.7074 to 0.7085 and do not follow the pattern defined for the Sr evolution on seawater global curves.
These findings help to reinforce the previous hypothesis that the São Francisco basin was deposited in a restrict environment with intermittent connections with an open sea. Moreover, our results indicate that basin global correlations should be done with caution on sedimentary successions when the geotectonic evolution of the basin in not fully understood.