**APPENDIX C. DETRITAL-ZIRCON GEOCHRONOLOGY**

*Methods*

The sample preparation for zircon analysis included crushing, sieving, Wilfley density separation, and Frantz magnetic separation. A grain mount of about 120 zircons per sample was made by random picking using a binocular microscope. After polishing the mount to expose the zircon walls, every sample was scanned by binocular microscope to evaluate the external structure (shape, roundness, color) and by cathodoluminiscence to obtain details of the interior structure (zonation, inherited cores, inclusions). We analyzed cores and rims of the zircon grains by laser ablation inductively coupled mass spectrometry (LAICP-MS) with a laser beam spot of 23 μm on a target fluence of 6 J/cm. The maximum depositional age was estimated using a weighted mean of the youngest zircon cluster, following the method of Dickinson and Gehrels (2009). All the analyses were made at the Laboratorio de Estudios Isotópicos (LEI) of the Centro de Geociencias-UNAM.

Figure captions

C1. A) Tera-Wasserburg U-Pb concordia diagram for detrital-zircon analysis of Atzompa Formation (data-point error ellipses are at 2σ). Samples MIS164, MIS166, and MIS163 are located in the stratigraphic sections (Figs. 2, 3, and Appendix B). Wetherill U-Pb concordia diagrams for detailed ages: B) La Magdalena Member, C) Lower Santa Marta Member, D) Upper Santa Marta Member. For raw data see Appendix D.