

Connelly Daniel P., MAPCIS Research Project, 4815 Covered Bridge Rd, Millville, NJ 08332

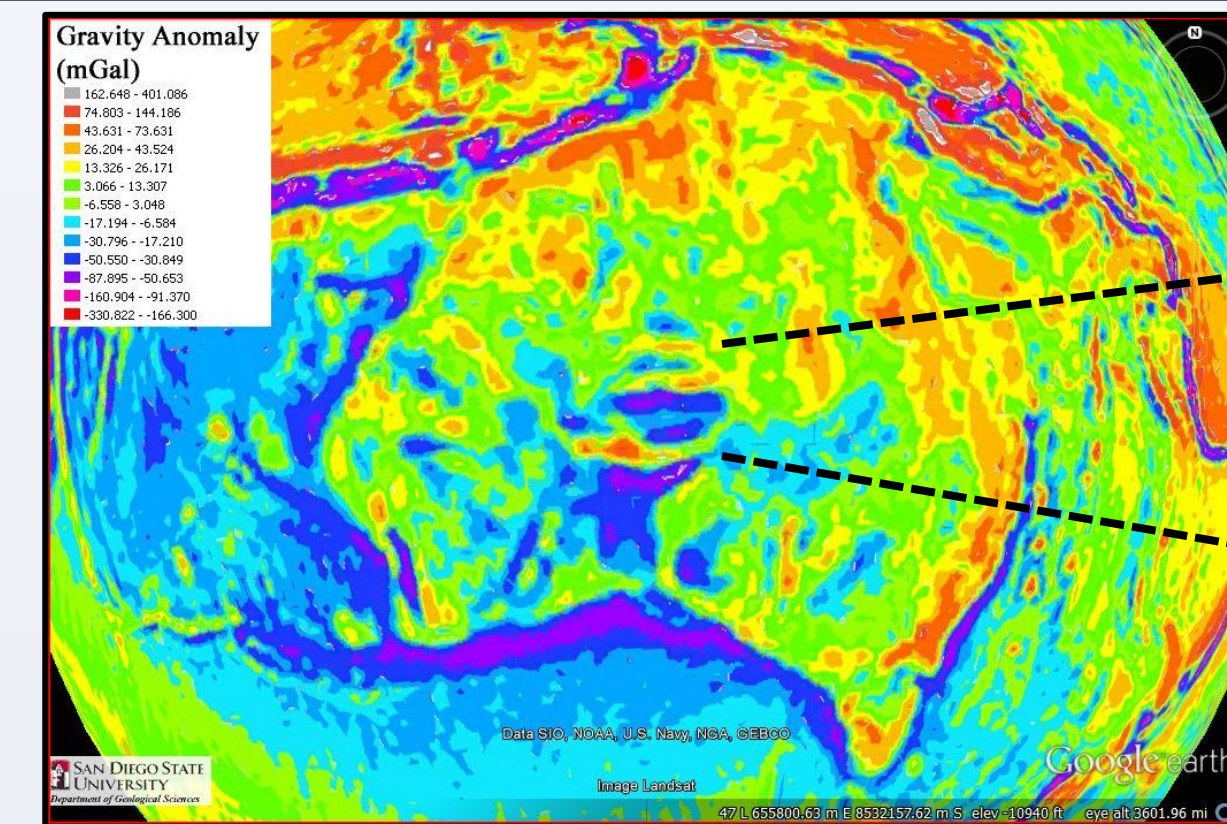
Sikder, Arif M., Center for Environmental Studies (CES), Virginia Commonwealth University (VCU), 1000 West Cray St., Richmond, VA 23284

ABSTRACT

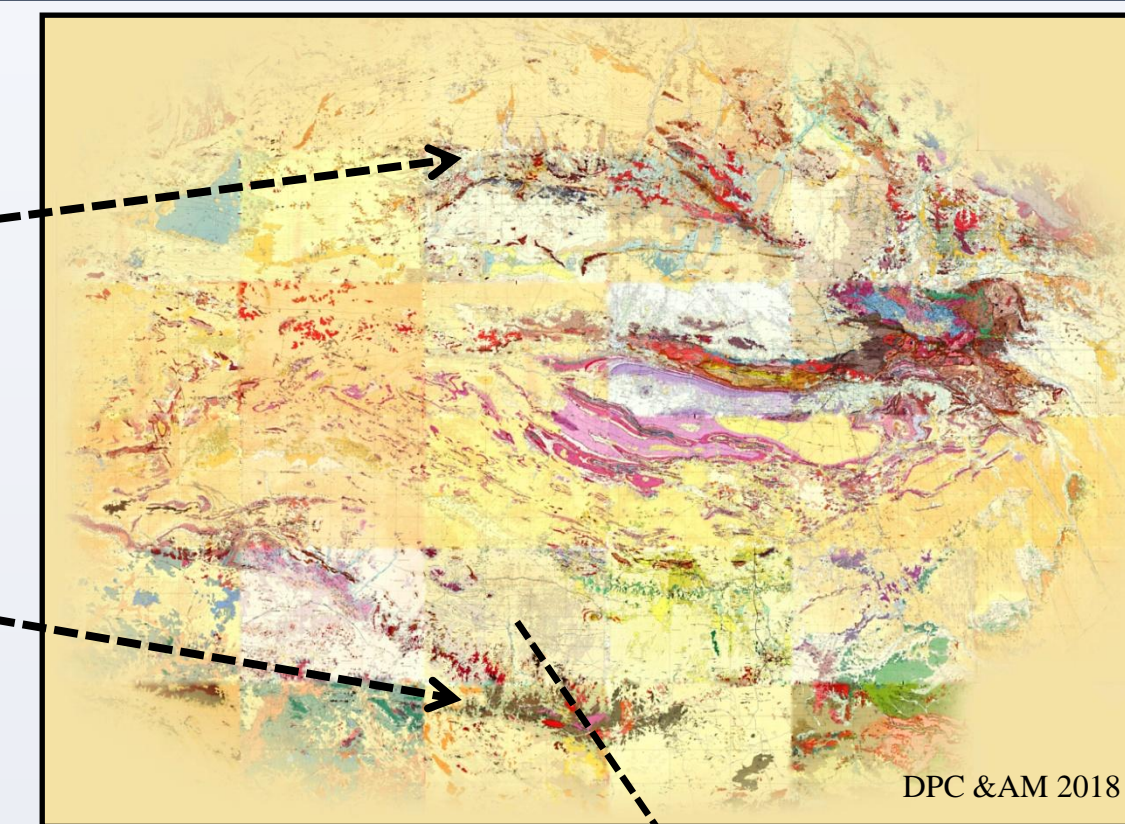
Early researchers interpreted the pseudotachylite breccia from the Musgrave Province Australia as generated by normal seismic processes despite the large volume of the deposits. The Musgrave pseudotachylite breccias deposits are about 5km wide and run intermittently for 300km with approximately 4% to 10% pseudotachylite melt. The seismic origin was postulated based on the proximity of the Woodroffe Thrust Fault, with up to three generations of pseudotachylite melts found in some of the Musgrave samples. This traditional seismic interpretation continued even though some pseudotachylite deposits are radial to an impact center (MAPCIS) and 40km from the Woodroffe Thrust Fault along with multiple generation pseudotachylite being known to occur at other large impact sites.

The evidence on the mega and macro scale along elemental analysis with having been found and presented over the last ten years in support of a large impact in central Australia coeval with the established dating of the Precambrian/Cambrian boundary, the ultimate evidence is the finding of shock features within the minerals, specifically the pseudotachylite breccia, near the impact center.

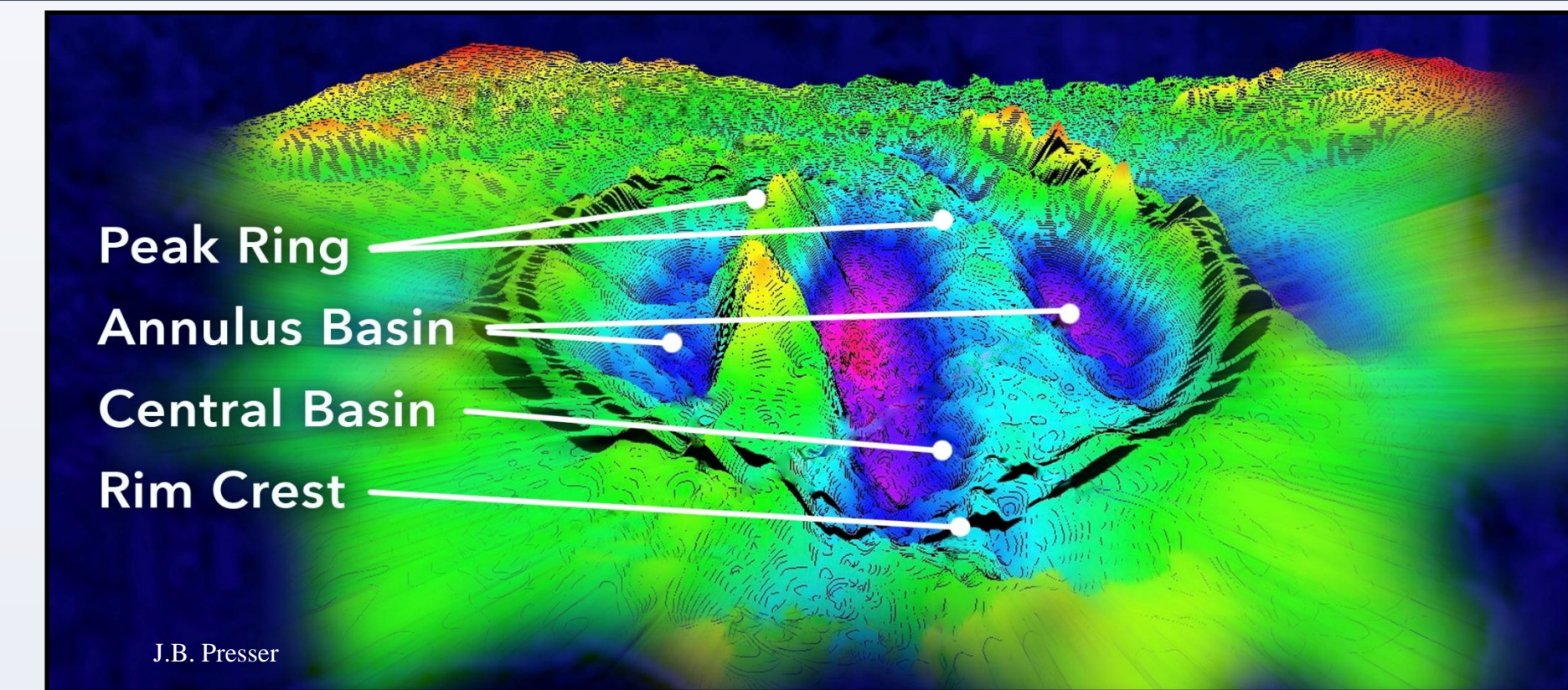
Petrographic investigation revealed shocked quartz grain with multiple sets of PDFs, along with shocked feldspar and diaplectic glasses the wall rock adjacent to the pseudotachylite melt. The results strongly suggest Musgrave province pseudotachylite breccia received shock forces consistent with a large impact.



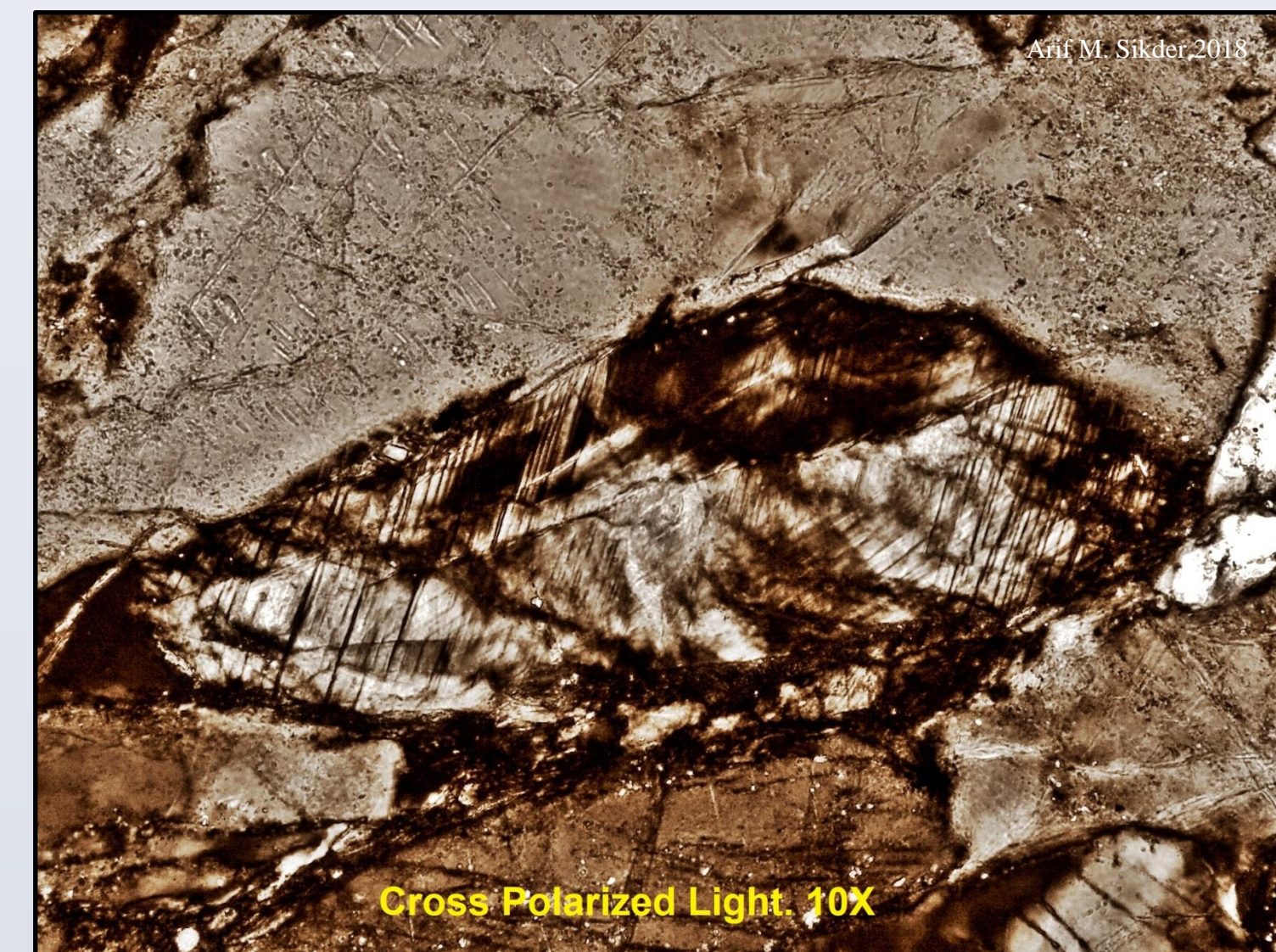
The 600km diameter circular anomaly is clearly seen on the Grace Gravity Anomaly Map of the world.



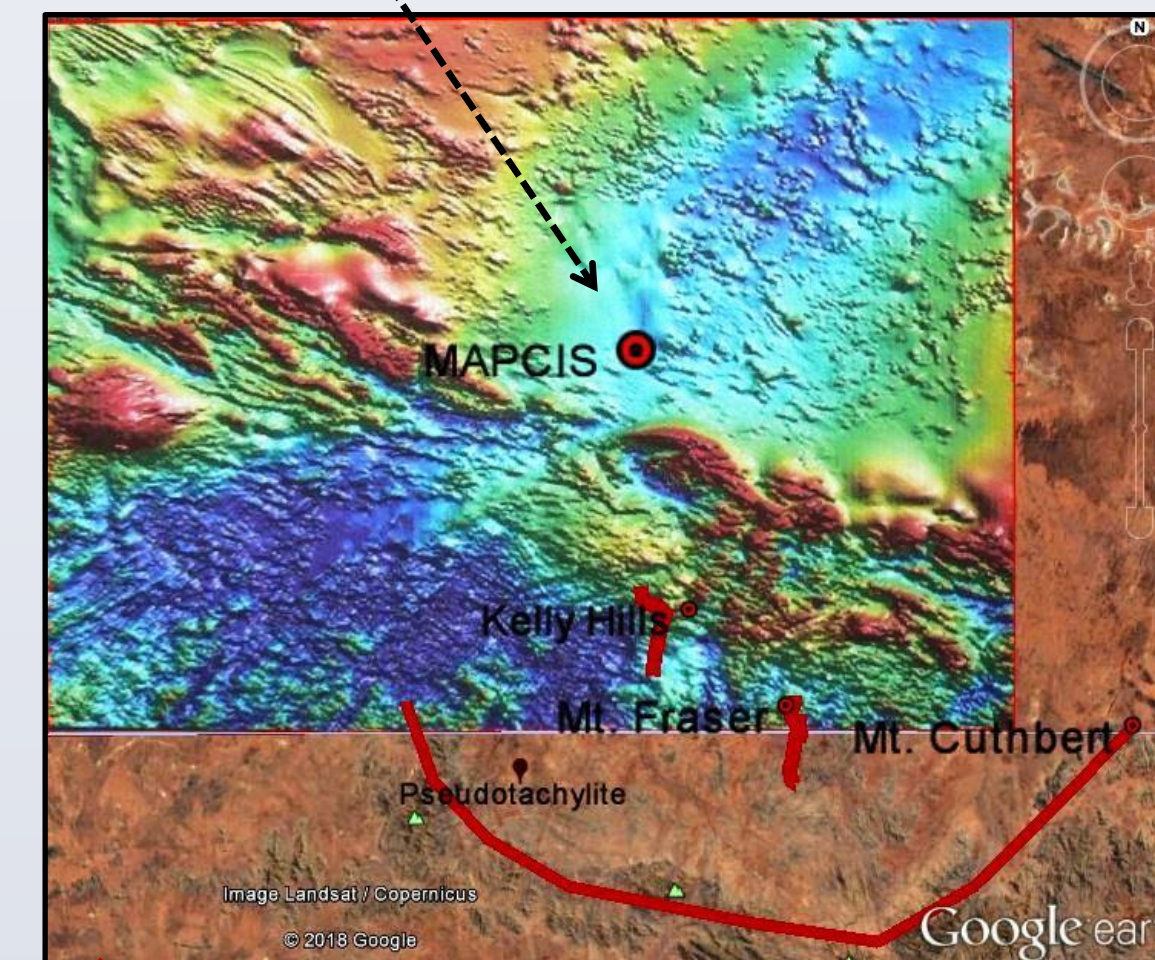
The 600km diameter crater rim is exposed on the 1:250,000 surface GA geology maps when they are combined across political boundaries.



When examined in 3D or cross section, expected structures can be mapped and up to 15km of Continental crust is missing



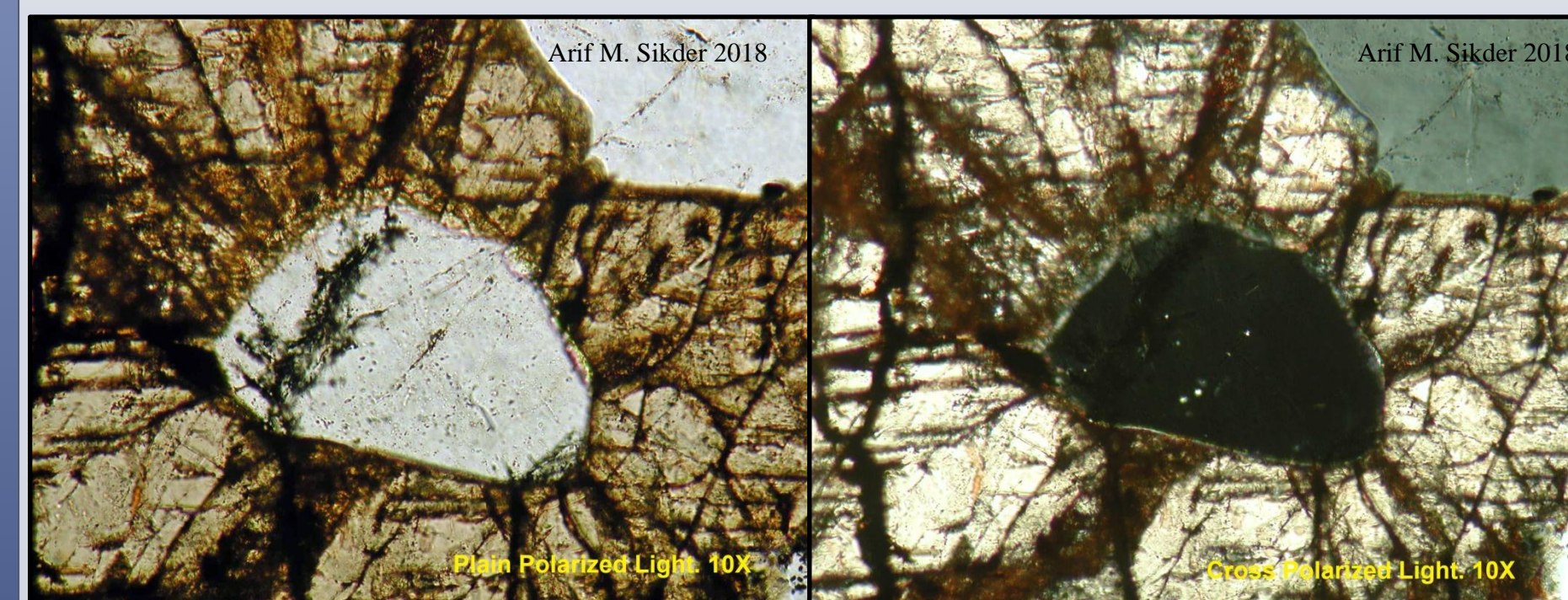
Diaplectic glass and multiple sets of planar deformation features (PDFs) and partial isotropization of quartz in the samples of Mount Frazer .



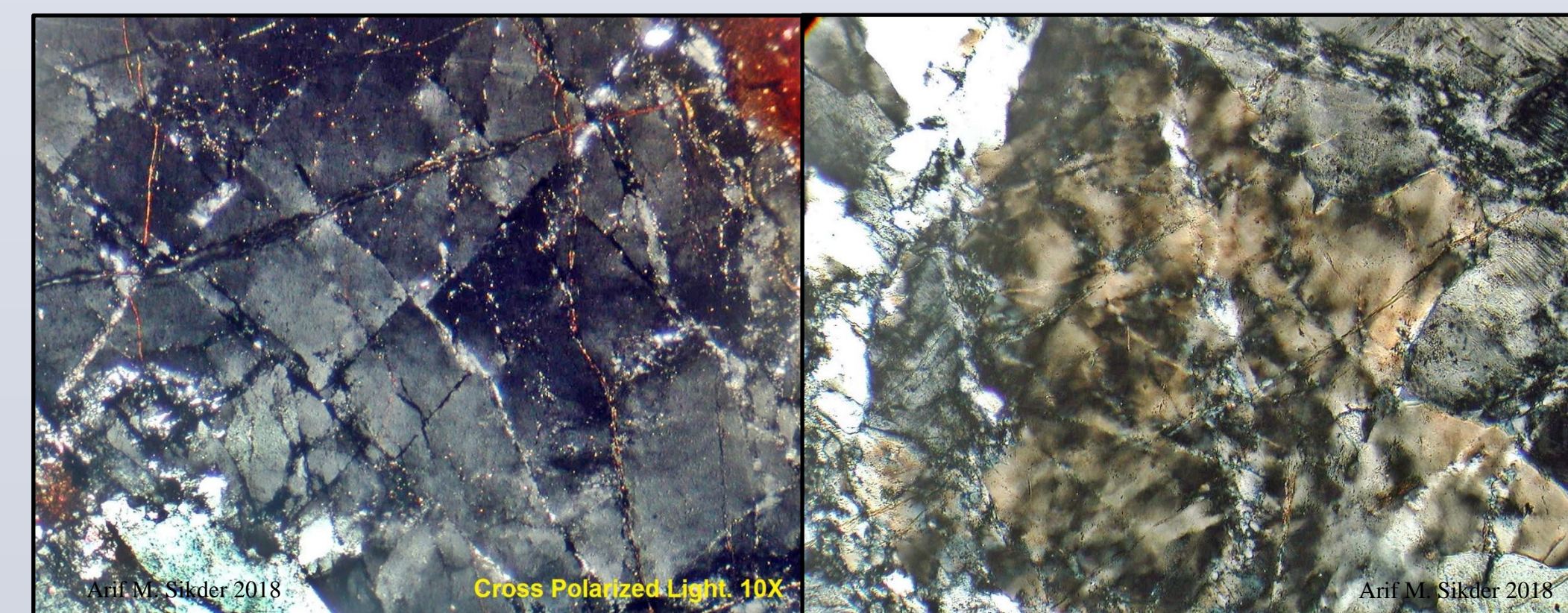
The magnetic anomaly map at the impact center suggests an impact similar but larger than Vredefort which has been shown to be a good model, especially for the emplacement of the Pseudotachylite breccia.



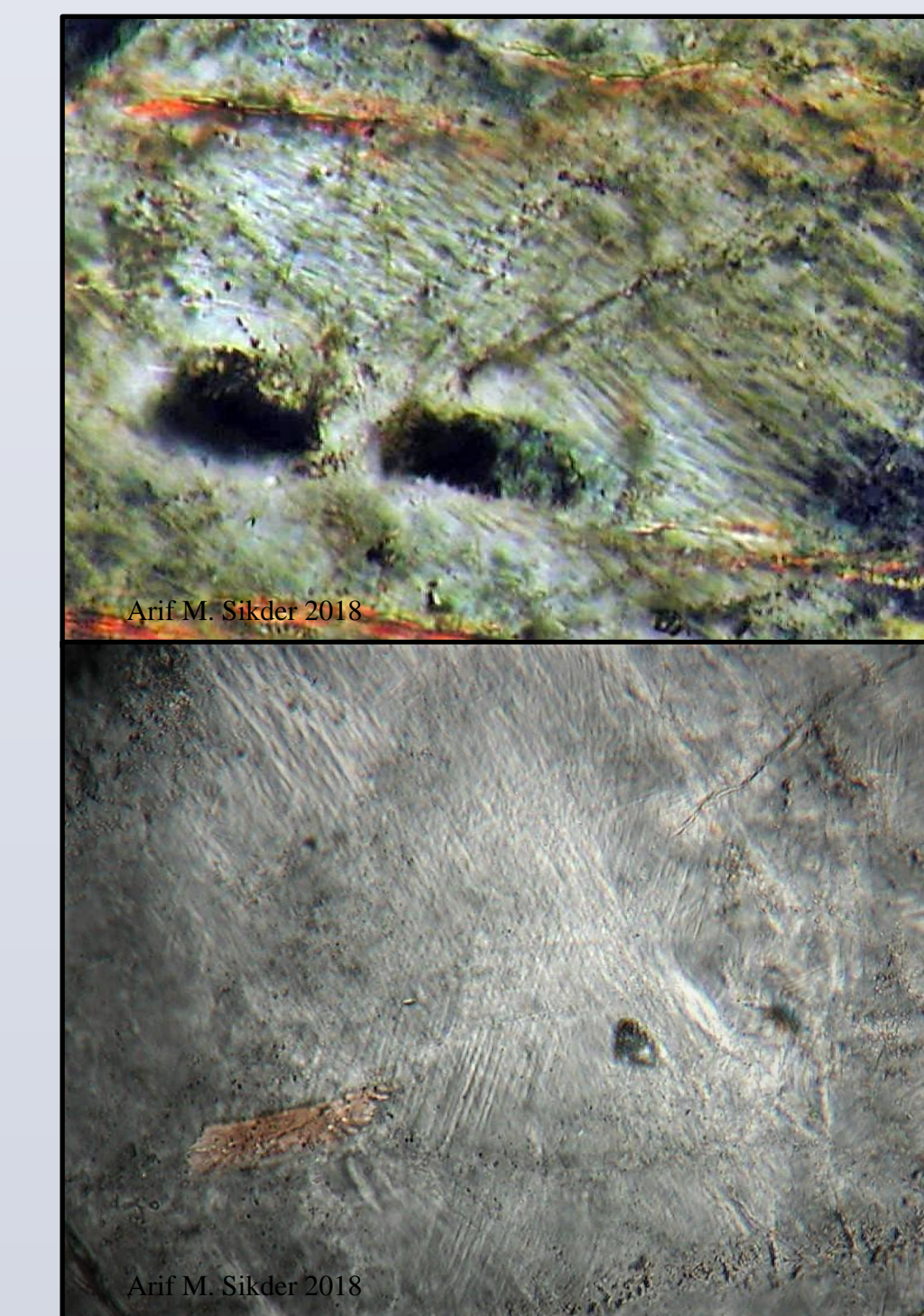
Pseudotachylite breccia similar to those found at Sudbury and Vredefort impacts is found in massive deposits near the center of the impact. It is found to have high iridium concentrations and for this presentation in the breccia is found distinct **confirmatory** impact indicators.



Thetomorph is diaplectic glass that usually retain their original shape, at even higher pressures, crystals may undergo atomic-structural displacements that convert them to glasses without passing through a melt stage.



Effects of Shock metamorphism in quartz grains resulted in the development of intersection of two sets of micro fractures with displacement and spots of partial isotropization, i.e. diaplectic glass



Shock metamorphism effects in feldspar grains. Orthoclase feldspar with a single set of short, narrow, closely spaced planar features.

Discussion

There are phases in researching an impact structure. There are the discovery phase, the confirmation phase of ground truthing and testing, the reproducibility of research phase and finally the wider recognition phase. These phases are sequential, overlapping and never ending as new discoveries are made.

Over the past ten years there have been many discoveries associated with the **Massive Australian Precambrian/Cambrian Impact Structure** commonly known as **MAPCIS**. There is **mega** evidence of geomorphology, the multiple ring structure which can be seen as a 600km diameter crater rim on surface geology maps, drainage maps and in the missing continental crust as shown through deep gravity imaging. The MASCON uplift associated with large peak ring type impact structures is dated and defined as a single structure by the subsequent Kalkarindji large Igneous Province ~510 Ma and the Mooracoochie volcanics ~517Ma. The center of MAPCIS has a well defined magnetic anomaly so similar to the Vredefort impact center that they are almost interchangeable. Around MAPCIS center are the largest known deposits of Pseudotachylite breccia proportionally placed like what is found around the well mapped Vredefort impact. There are the tens of billions of dollars worth of nickel, copper and platinum groups elements found in a 60 degree angle directly downrange from MAPCIS impact center.

There is **macro** evidence with the most important being the pseudotachylite breccia specimens collected from locations 40km, 60km and 100km from the center of MAPCIS from both radial and arcuate deposits. The author traveled to the Sudbury Impact, Canada and the Vredefort Impact in South Africa to directly compare Pt. breccias found at those sites with MAPCIS Pt. breccia. On the macro and mega scale there is nothing unusual about MAPCIS Pt. breccia as an impact Pt. breccia. On the other hand, MAPCIS Pt. breccia would be unique and unprecedented if it remains labeled a seismic Pt. breccia.

There is the most important **micro** evidence of impact indicators and elemental analysis put into the context of the mega and macro evidence. In the melt and breccia from the MACPIS Pt. breccia specimens are found iridium levels consistent with other known impact boundaries and impact melts. For this GSA presentation, **Arif M. Sikder**, diligently searched, found and identified, **diaplectic glass, shocked feldspar and PDFs in shocked quartz** from the MACPIS Pt. breccia specimens.

There is much more to MACPIS than is presented here. MACPIS is well dated to be the boundary impact for the Precambrian to Cambrian. You will need to download and read the other presentations from the last ten years.

In Conclusion: The discovery phase is ongoing. The confirmation phase is fulfilled but never finished. MAPCIS is **confirmed** as a 600km diameter impact structure dating to the beginning of the Cambrian. Now we are entering the phase where others will reproduce and verify the research. The wider recognition will happen on its own.

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