Analysis of the Orientale Basin

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The Orientale Basin

- A basin or crater on the moon.
- Located on the western area of the nearside.
- It can only partially be seen by telescopes from earth.
- It is around 930 kilometers in diameter from east to west.
- It takes up around 1/10 of one side of the moon.
What is the Orientale Basin?

• The youngest impact basin that is currently on the moon.

• Believed to be younger than the Imbrium Basin, also located on the moon, which was dated to be created around 3.95 Billion years ago.

• Being an impact basin, it was formed by space debris which hit and caused an indentation to the surface.
Structure of the Orientale Basin

- Orientale is fairly uncontaminated, or unflooded by mare basalts which makes it easier to see the structure of the basin.

- The basin is made up from inside out the Inner Rock Mountains, the Outer Rock Mountains and the Cordillera Mountains. The Cordillera’s are the defining shape of the 930 km diameter.

- The mountains are the ridges that are seen inside the Orientale.
PROMINENT FEATURES
Formed by impact of an asteroid sized object that hit the moon creating fractures on the crust.
THREE CONCENTRIC RINGS
• Three Concentric Rings
  ○ Outermost Ring- 930 km (Cordillera Mountains)
  ○ Two Inner Rings- (Rook Mountains)
Southern Portion

Center
-A thin layer of mare basalt covers it

Inner Rock Mountains

Outer Rock Mountains

Layer is less than 1 kilometer deep
Shadows on the western sides of both mountain ranges shows that there is vast elevation difference.

Area between the rings is not completely smooth.

These areas were made by material that was melted by the energy of the impact and covered the other impact ejecta.
Mare Orientale Depth

Blue = -4000 meters
ORIENTALE SECONDARY FEATURES
Secondary Craters

Craters formed by ejecta (which is the debris created during the creation of an impact crater) falling from massive impacts.

Many secondary craters are catenae, or crater chains. Secondary craters which are not in clusters or chains are often difficult to distinguish from small primary craters. They are distinguishable by their morphology, with secondary craters being shallower.
Catenae

- Catenae, or crater chains, are a form of secondary craters.

- They are formed through a number of processes, one of which is debris flying out from a larger impact and creating these smaller craters radiating from the larger one. Another way is that they could be volcanic in origin, where the ground collapses upon an empty lava tube, these are known as pit craters.

- These are most likely created by the former, as they radiate from the Mare Orientale.
The Lacus Autumni is a region of Lunar Mare near the Mare Orientale.

Only the central and southeastern portions of the lake have the albedo expected of a lunar mare.

The rest of the "lake" matches the typical terrain.

This was plausibly due to volcanic activity after the formation of Mare Orientale.

This image shows Lacus Autumni from an angle illustrating the geological features.