

= Aristarchus (crater) =

Aristarchus , named after the Greek astronomer Aristarchus of Samos , is a prominent lunar impact crater that lies in the northwest part of the Moon 's near side . It is considered the brightest of the large formations on the lunar surface , with an albedo nearly double that of most lunar features . The feature is bright enough to be visible to the naked eye , and is dazzling in a large telescope . It is also readily identified when most of the lunar surface is illuminated by earthshine . The crater is larger than the Grand Canyon .

The crater is located at the southeastern edge of the Aristarchus plateau , an elevated area that contains a number of volcanic features , such as sinuous rilles . This area is also noted for the large number of reported transient lunar phenomena , as well as recent emissions of radon gas as measured by the Lunar Prospector spacecraft .

= = Selenography = =

Aristarchus is located on an elevated rocky rise , known as the Aristarchus Plateau , in the midst of the Oceanus Procellarum , a large expanse of lunar mare . This is a tilted crustal block , about 200 km across , that rises to a maximum elevation of 2 km above the mare in the southeastern section . Aristarchus is just to the east of the crater Herodotus and the Vallis Schröteri , and south of a system of narrow sinuous rilles named Rimae Aristarchus .

Aristarchus is bright because it is a young formation , approximately 450 million years old , and the solar wind has not yet had time to darken the excavated material by the process of space weathering . The impact occurred following the creation of the ray crater Copernicus , but before the appearance of Tycho . Due to its prominent rays , Aristarchus is mapped as part of the Copernican System .

The brightest feature of this crater is the steep central peak . Sections of the interior floor appear relatively level , but Lunar Orbiter photographs reveal the surface is covered in many small hills , streaky gouges , and some minor fractures . The crater has a terraced outer wall , roughly or polygonal in shape , and covered in a bright blanket of ejecta . These spread out into bright rays to the south and south @-@ east , suggesting that Aristarchus was most likely formed by an oblique impact from the northeast , and their composition includes material from both the Aristarchus plateau and the lunar mare .

In November 2011 , the Lunar Reconnaissance Orbiter passed over the crater , which spans almost 25 miles (40 kilometers) and sinks more than 2 miles (3 @.@ 5 kilometers) deep . " The Aristarchus plateau is one of the most geologically diverse places on the moon : a mysterious raised flat plateau , a giant rille carved by enormous outpourings of lava , fields of explosive volcanic ash , and all surrounded by massive flood basalts , " said Mark Robinson , principal investigator of the Lunar Reconnaissance Orbiter Camera at Arizona State University . NASA released photos of the crater on December 25 , 2011 .

= = Remote sensing = =

In 1911 , Professor Robert W. Wood used ultraviolet photography to take images of the crater area . He discovered the plateau had an anomalous appearance in the ultraviolet , and an area to the north appeared to give indications of a sulfur deposit . This colorful area is sometimes referred to as " Wood 's Spot " , an alternate name for the Aristarchus Plateau .

Spectra taken of this crater during the Clementine mission were used to perform mineral mapping . The data indicated that the central peak is a type of rock called anorthosite , which is a slow @-@ cooling form of igneous rock composed of plagioclase feldspar . By contrast the outer wall is troctolite , a rock composed of equal parts plagioclase and olivine .

The Aristarchus region was part of a Hubble Space Telescope study in 2005 that was investigating the presence of oxygen @-@ rich glassy soils in the form of the mineral ilmenite . Baseline measurements were made of the Apollo 15 and Apollo 17 landing sites , where the chemistry is

known , and these were compared to Aristarchus . The Hubble Advanced Camera for Surveys was used to photograph the crater in visual and ultraviolet light . The crater was determined to have especially rich concentrations of ilmenite , a titanium oxide mineral that could potentially be used in the future by a lunar settlement for extracting oxygen .

= = Transient lunar phenomena = =

The region of the Aristarchus plateau has been the site of many reported transient lunar phenomena , with a total of 122 such reports by 2007 ; the highest recorded for any lunar feature . Such events include temporary obscurations and colorations of the surface , and catalogues of these show that more than one @-@ third of the most reliable spottings come from this locale . In 1971 when Apollo 15 passed 110 kilometers above the Aristarchus plateau , a significant rise in alpha particles was detected . These particles are believed to be caused by the decay of radon @-@ 222 , a radioactive gas with a half @-@ life of only 3 @.@ 8 days . The Lunar Prospector mission later confirmed Radon @-@ 222 emissions from this crater . These observations could be explained by either the slow and visually imperceptible diffusion of gas to the surface , or by discrete explosive events .

= = Names = =

Aristarchus is named after the Greek astronomer Aristarchus of Samos . Like many of the craters on the Moon 's near side , it was given its name by Giovanni Riccioli , whose 1651 nomenclature system became standardized in 1935 . Earlier lunar cartographers had given the feature different names . Michael van Langren 's 1645 map calls it " Balthazaris Hispa . Pri . " after Balthazar Charles , then the heir apparent to the kingdoms of Spain . And Johannes Hevelius called it " Mons Porphyrites " after the mountains near Olbia , Egypt . A particular region of very low ultraviolet albedo is called Wood 's Spot after its discoverer , Robert W. Wood .

= = Satellite craters = =

Surrounding Aristarchus are several smaller craters , many of which are probably secondary craters . Secondary craters form when large blocks ejected from the primary crater reimpact the surface at high velocities . By convention these features are identified on lunar maps by placing a letter on the side of the crater midpoint that is closest to the primary crater .

The following craters have been renamed by the IAU .

Aristarchus A ? See Väisälä .

Aristarchus C ? See Toscanelli .