Your PLANETS Science Data Packet

for:

Worlds Apart! Remote Sensing of Mars

Activity 3
Landforms on Mars
(*Level Up!* with Four Sites)

Map of Mars

Map of possible Mars landing sites. **Nili Fossae** and **Jezero Crater** are close to each other and are farther north than the other two sites. **Gale Crater** and **Iani Chaos** are near the equator and are not close to any other sites.

Gale Crater—Gale is a crater 96 miles (154 km) across. The middle of the crater has a mountain that is 3.4 miles (5.5 km) tall. The possible landing site is in the northwestern part of the crater and includes the crater floor and the hills near the central mountain.

Iani Chaos (ee-Ah-nee Kay-oss)—Iani is one of several "chaos" areas on Mars, which scientists think form when a huge amount of underground water is released, causing giant floods and the collapse of the area where the water was stored. The possible landing site is in one small part of the Iani Chaos.

Jezero (Jez-er-oh) **Crater**—Jezero is a crater 30 miles (39 km) across. The possible landing site is in the western part of the crater.

Nili Fossae (Nee-lee Foss-eye) **Trough**—Nili Fossae is in a large, long valley. The possible landing site is on the floor of this valley.

Gale Crater:

Viking Data

True color visible light image of **Gale Crater** from the Viking orbiter. The box shows the area of interest. The center of the crater contains a mountain of rock, and several canyons are visible on the sides of the mountain.

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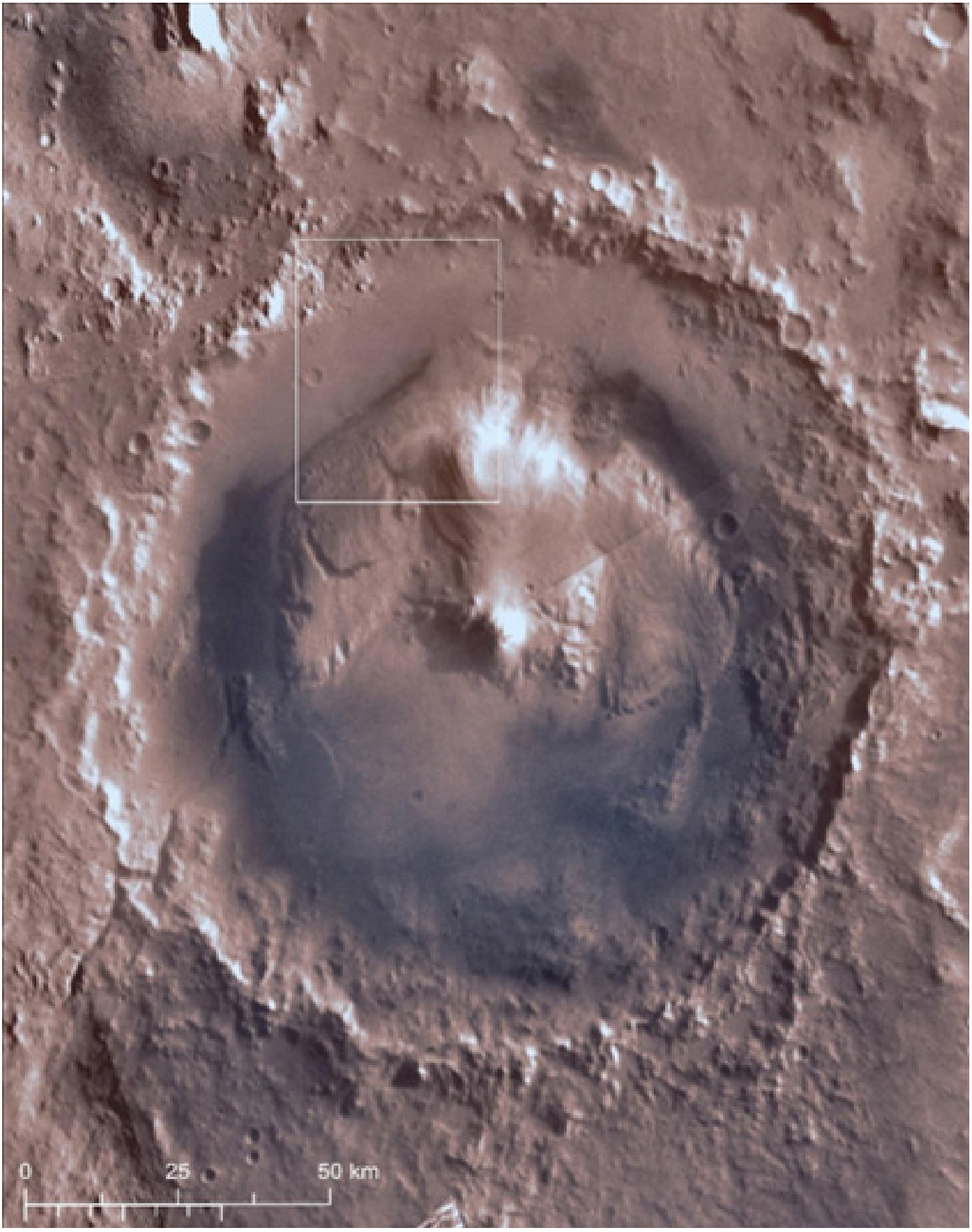
See next page for image.



Gale Low-Resolution Images. Source: Viking Orbiter

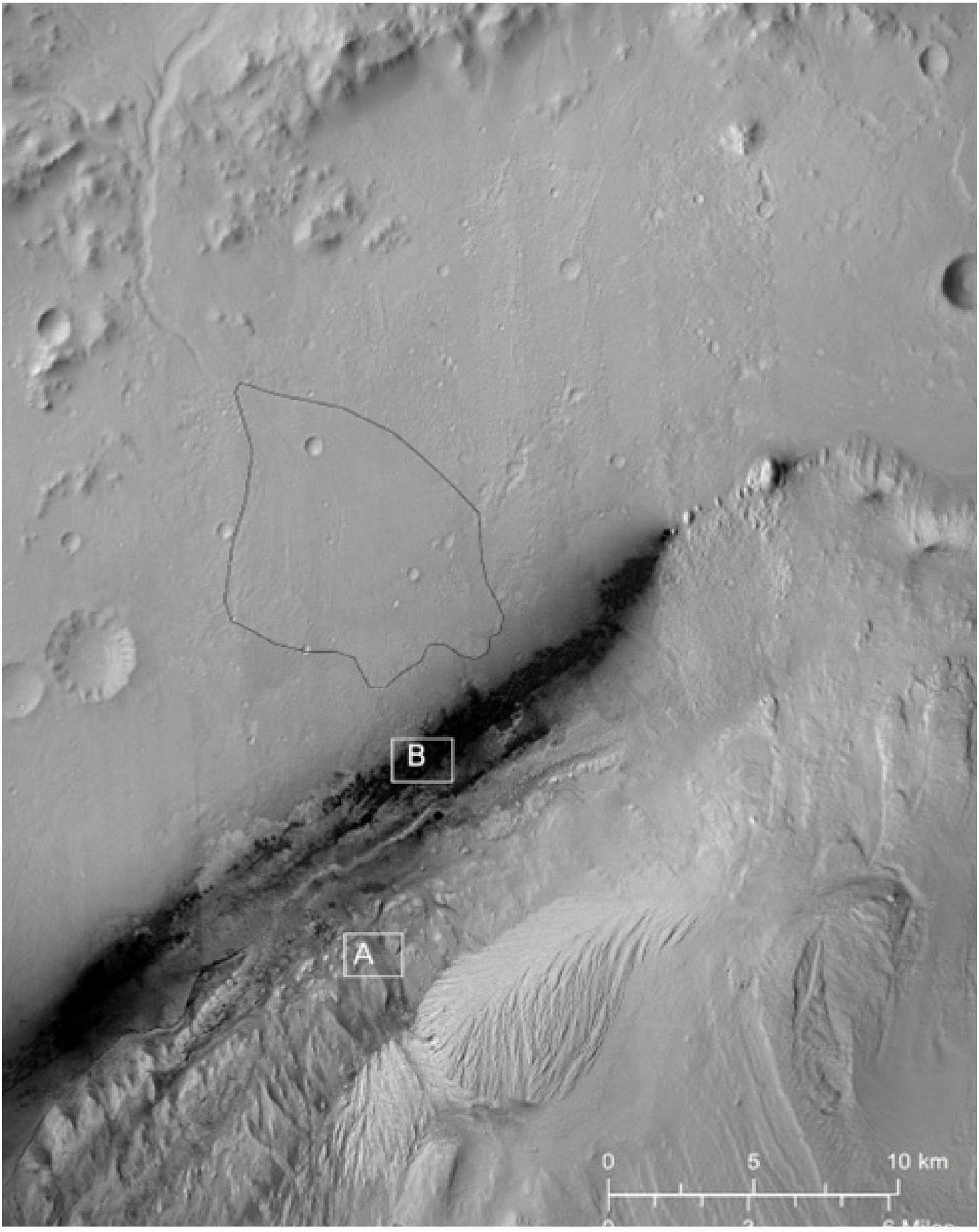
Context Camera (CTX) Data

Black and white zoomed-in image of the **Gale Crater** site taken by the Context Camera (CTX) and High Resolution Imaging Science Experiment (HiRISE) onboard the Mars Reconnaissance Orbiter.

✦ Place your oval on this site.

Black and white image of the possible landing site at Gale Crater. A valley extends from the foothills of the crater rim in the upper left down to the flat crater floor where it joins up with a fan-shaped landform that has been outlined in black. Both the alluvial fan and the surrounding crater floor are dotted with small bowl-shaped craters. Cutting through the middle of the image from northeast to southwest is a band of black sand dunes. Running parallel to the southern side of the dunes is a bright ridge of rock. In a broad band south of the bright ridge and the dark dunes, but parallel to them, the terrain is rugged, with many hills, buttes, and mesas formed from layered rocks. The image is about 35 km (22 miles) across.

See next page for image.



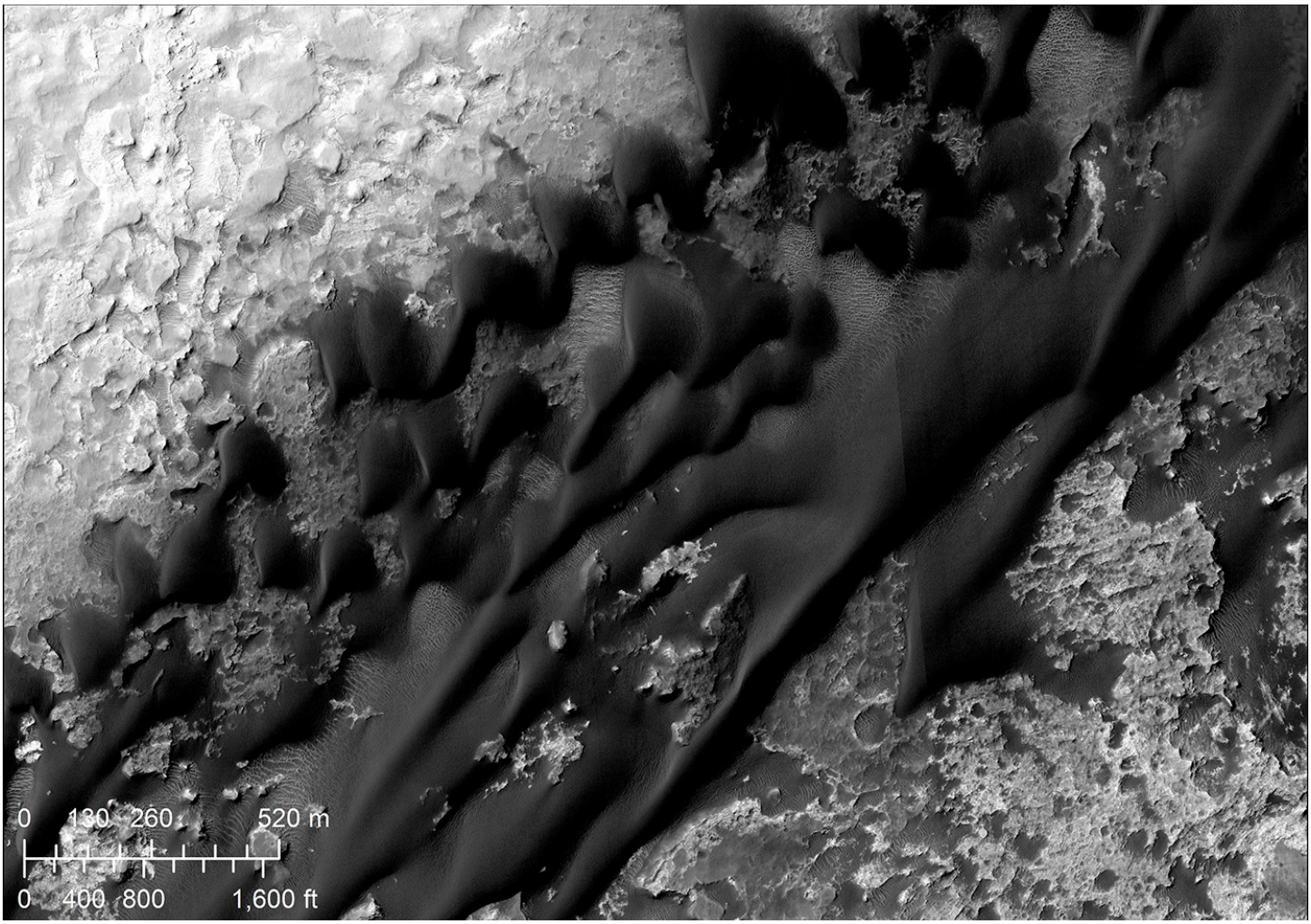
Gale Images. Source: High Resolution Imaging Science Experiment (HiRISE) and Context Camera (CTX)

High Resolution Imaging Experiment (HiRISE) Data

Black and white very zoomed in images of the **Gale Crater** site taken by the High Resolution Imaging Experiment (HiRISE) onboard the Mars Reconnaissance Orbiter.

Do not place an oval on these images.

Black and white image of part of Gale Crater, about 2.7 kilometers wide by 1.9 kilometers tall. From the southeast to the northwest is a river channel filled with darker rock and sand. The channel cuts through layers of dark gray and light gray. To the east and west of the channel, these banded rocks rise up to form prominent mesas. In the southeastern corner of the image, some light-toned sand dunes are visible in the valley, partly burying the sediment-filled river channel.



Black and white image of part of Gale Crater, about 2.7 kilometers wide by 1.9 kilometers tall. Dark sand dunes run from northeast to southwest. The dunes range in shape from long and narrow, to teardrop or “Pac-Man” shapes, with the “mouth” pointing toward the south. The overall appearance of the dune field is reminiscent of drips of wax accumulated on a candle, with a sense of “flow” toward the southwest. The rock exposed beneath the dunes in the northwest and southeast is rough in texture, with small pits and craters filled with dark sand from the dunes.

Iani Chaos

Viking Data

True color visible light image of **Iani Chaos** from the Viking orbiter. The area is called “chaos” because it looks like it is broken into pieces. The box shows the area of interest.

Do not place an oval on this image.

See next page for image.

Iani Chaos - Low-Resolution Images. Source: Viking Orbiter

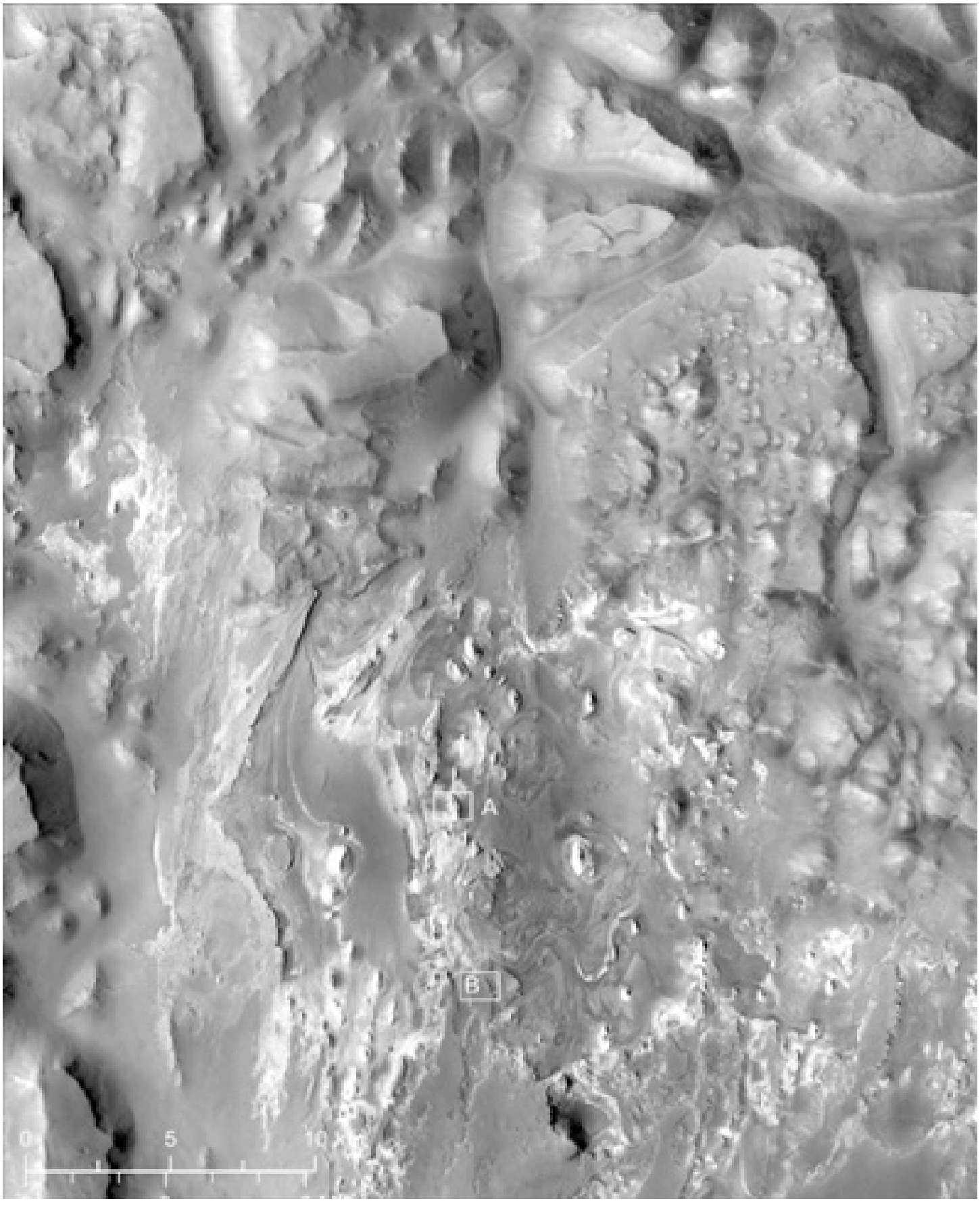
Context Camera (CTX) Data

Black and white zoomed-in image of the **Iani Chaos** site taken by the Context Camera (CTX) onboard the Mars Reconnaissance Orbiter.

Place your oval on this site.

Black and white image of the candidate Iani Chaos landing site. In the northern part of the image there are several flat-topped mesas separated by canyons. About a third of the way down the image, the large mesas and canyons transition to rougher layered terrain with brighter rocky patches dotted with many smaller, steeper mesas. The full width of the image is about 35 km (22 miles).

See next page for image.

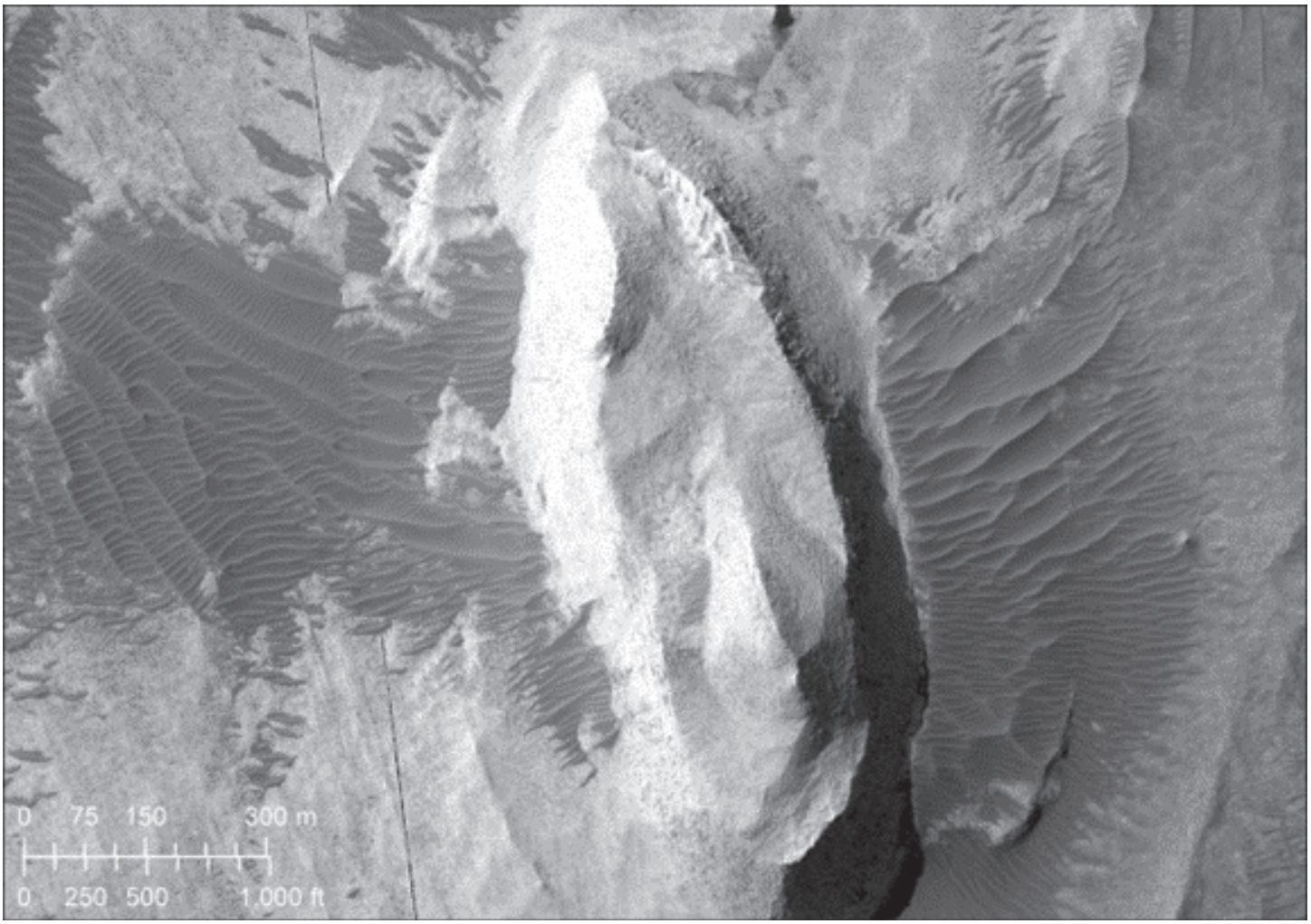


Iani Chaos - Images. Source: Context Camera (CTX)

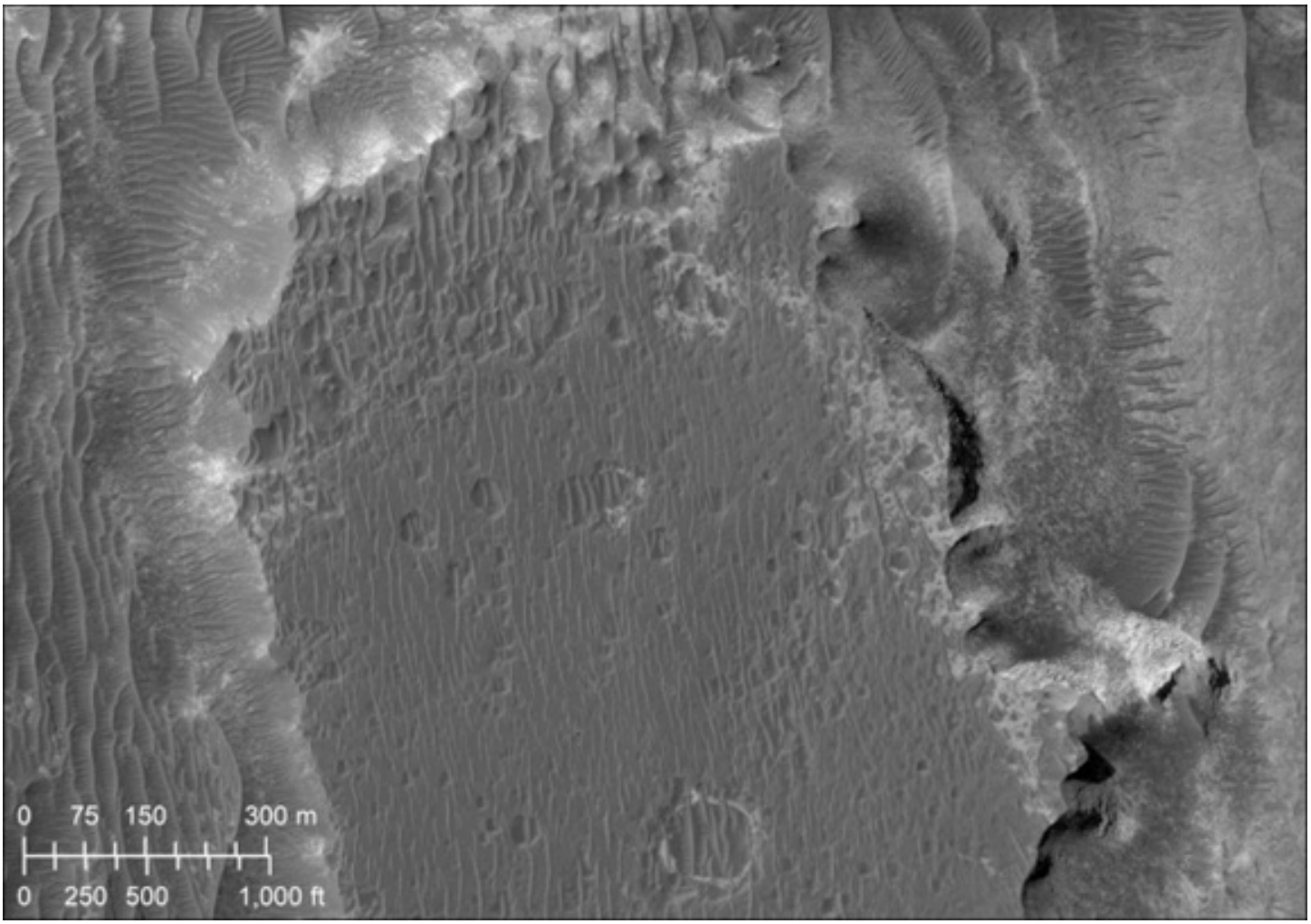
High Resolution Imaging Experiment (HiRISE) Data

Black and white very zoomed in images of the **Iani Chaos** site taken by the High Resolution Imaging Experiment (HiRISE) onboard the Mars Reconnaissance Orbiter.

Do not place an oval on these images.



Black and white image of part of the Iani Chaos site. The image is about 1.6 km (1 mi) wide by 1.1 km (0.7 mi) tall. A light gray rocky mesa cuts through the center of the image from north to south. It is roughly 300 meters wide and tapers to a point near the top of the image, resembling a giant stone arrowhead. On either side of this mesa are dark gray sand dune fields, partially covering smooth light-colored rock.



Black and white image of part of the Iani Chaos site. The image is about 1.6 km (1 mi) wide by 1.1 km (0.7 mi) tall. In the middle of the image is a ~600-800 m wide plateau, possibly formed by a lava flow, with a rounded outline formed by sharp slopes to the left, top and right. The mesa extends past the bottom of the image. The surface of the mesa has many north-south oriented sand ripples which look like small ridges and many small circular pits or craters. A couple of the craters are larger than ~50 m across, and light-toned rock is exposed in a circle along their walls. Most of the area to the west of the mesa is covered by sand dunes, and there are some to the east of the mesa as well.

Jezero Crater

Viking Data

True color visible light image of **Jezero Crater** from the Viking orbiter. The eastern and western rims of the crater are cut by canyons. The box shows the area of interest.

Do not place an oval on this image.

See next page for image.

Jezero - Low-Resolution Images. Viking Orbiter

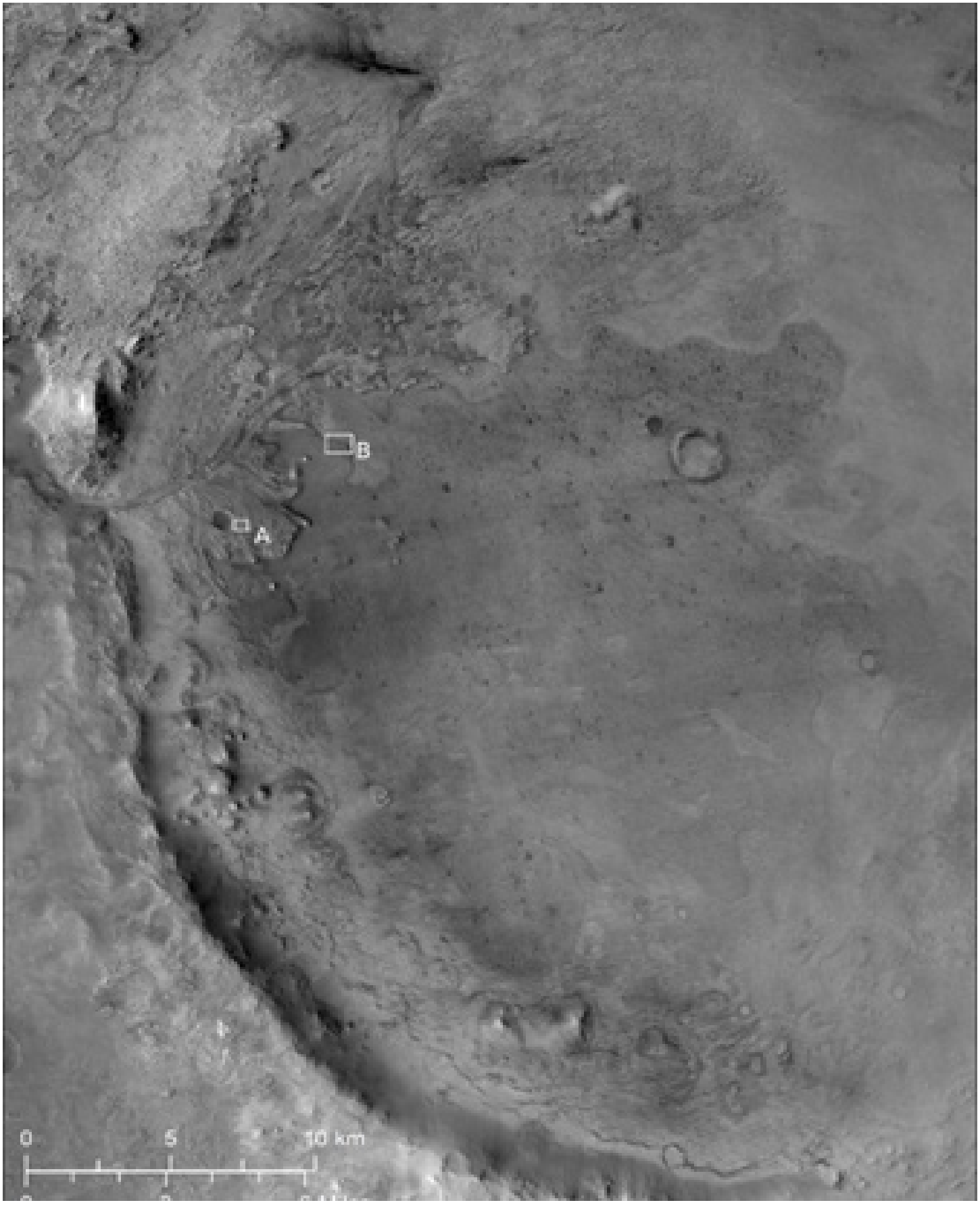
Context Camera (CTX) Data

Black and white zoomed-in image of the **Jezero Crater** site taken by the Context Camera (CTX) onboard the Mars Reconnaissance Orbiter.

✦ Place your oval on this site.

Black and white image of the Jezero Crater site. The crater rim forms a circle of mountains that touches the western and southern edges of the image. The eastern crater rim is outside the area shown. A valley cuts through the middle of the western crater rim and leads to a raised delta deposit. Most of the crater floor is smooth terrain with many small craters. Northeast of the delta, and farther out on the crater floor, there is a lighter-colored area without craters on it that interrupts the cratered plain forming a curving boundary that looks like the edge of a lava flow. Several rounded hills sit inside the western and southern portions of the crater rim.

See next page for image.

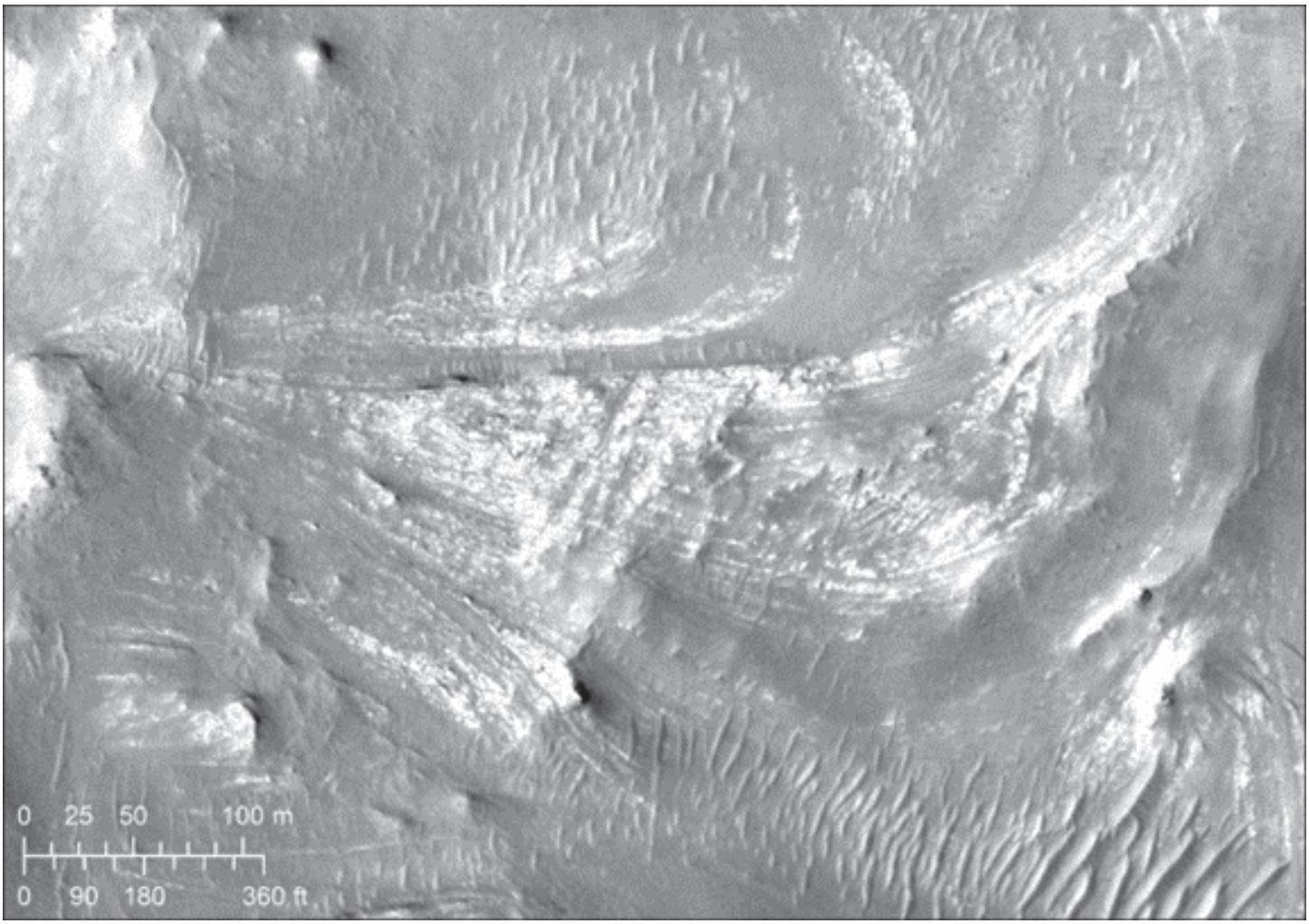


Jezero - Images. Source: Context Camera (CTX)

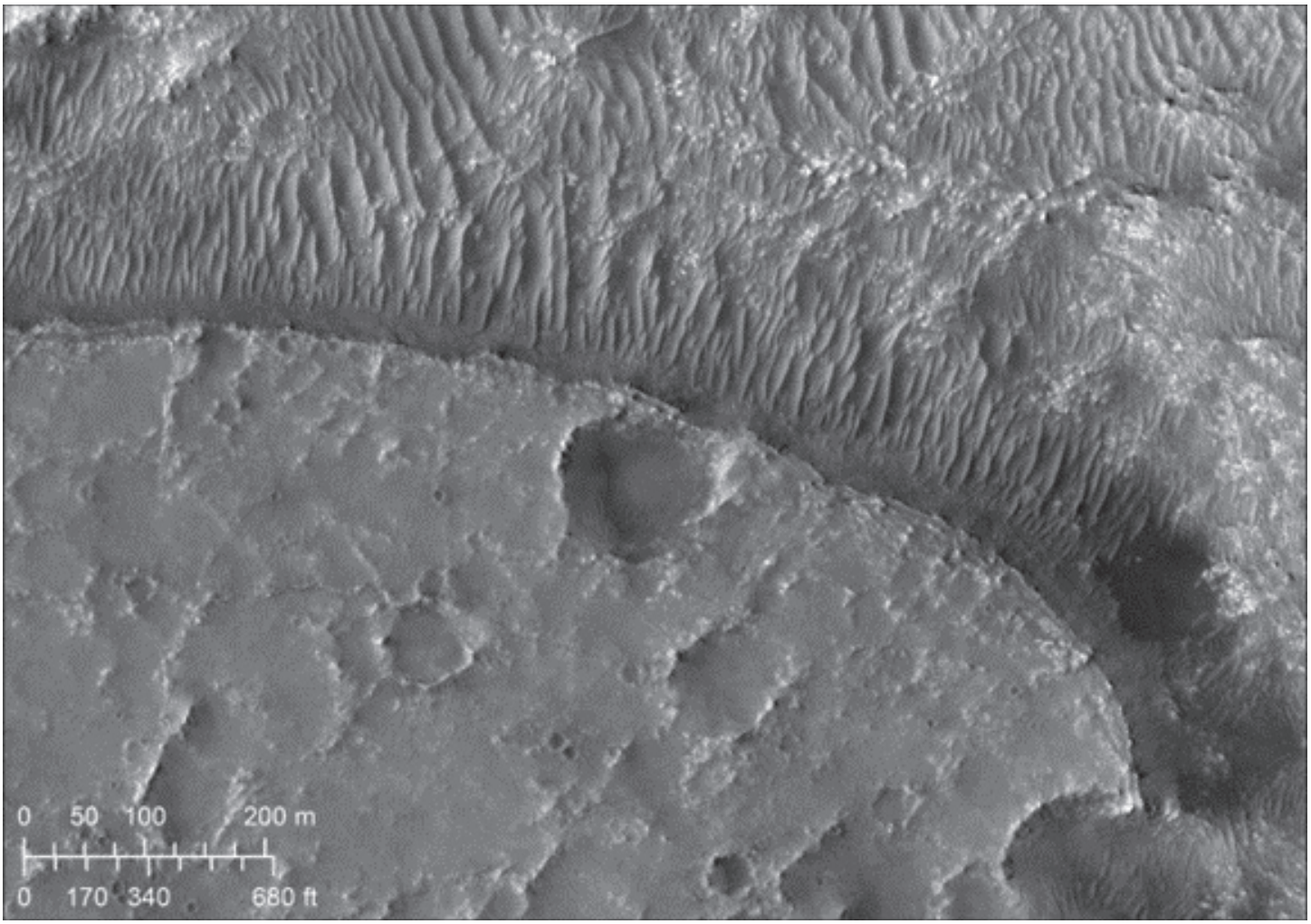
High Resolution Imaging Experiment (HiRISE) Data

Black and white very zoomed in images of the **Jezero Crater** site taken by the High Resolution Imaging Experiment (HiRISE) onboard the Mars Reconnaissance Orbiter.

Do not place an oval on these images.



Black and white image of part of the Jezero Crater site. The image is about 600 m wide by 420 m tall. The image has sets of bright, curving rock layers: the most prominent set begins forms a pattern similar to a backwards Nike “swoosh” logo, with lines drawn along its length, following its curves. In the north and south of the image the bright rocks are partly hidden under loose sediment that forms small sand dunes.



Black and white image showing part of the Jezero Crater site. The image is about 1.1 km wide by 760 m tall. The southwest portion of the image is filled by a large, dark, relatively flat lava flow surface with a rounded outline. The lava flow ends in a small cliff that curves from above the middle of the left side of the image down to just to the west of the lower right corner. The lava flow has numerous craters ranging from 10s to 100s of meters in size. On the north side of the curved lava flow boundary, there are many small sand dunes. The terrain below the sand dunes and at the northern part of the image is rougher, lighter, and less cratered than on top of the lava flow.

Nili Fossae

Viking Data

True color visible light image of **Nili Fossae** from the Viking orbiter. A large flat-floored canyon extends from the upper right to lower left of the image. The box shows the area of interest.

Do not place an oval on this image.

See next page for image.

Nili Fossae - Low-Resolution Images. Source: Viking Orbiter

Context Camera (CTX) Data

Black and white zoomed-in image of the **Nili Fossae** site taken by the Context Camera (CTX) onboard the Mars Reconnaissance Orbiter.

✦ Place your oval on this site.

Black and white image of the Nili Fossae landing site. A straight cliff cuts through the image from the southwest to the northeast, with higher elevation terrain to the west of the cliff and lower elevation to the east. In the upper middle of the image, the cliff is eroded away. To the east of the eroded area, there is a darker gray area with rounded edges like a lava flow. The straight diagonal line from the upper left to the lower middle is where two images meet, it is not a geologic landform.

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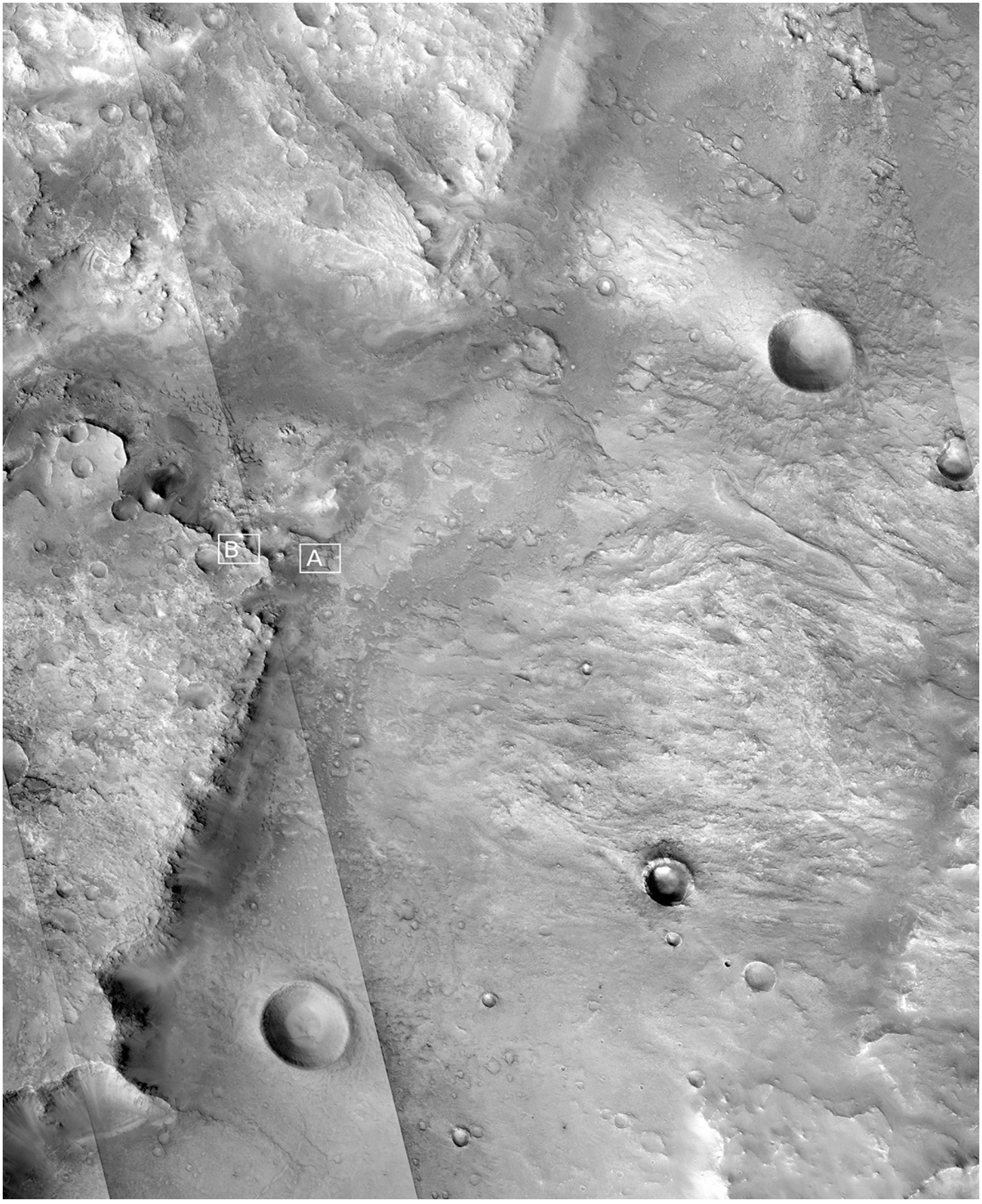
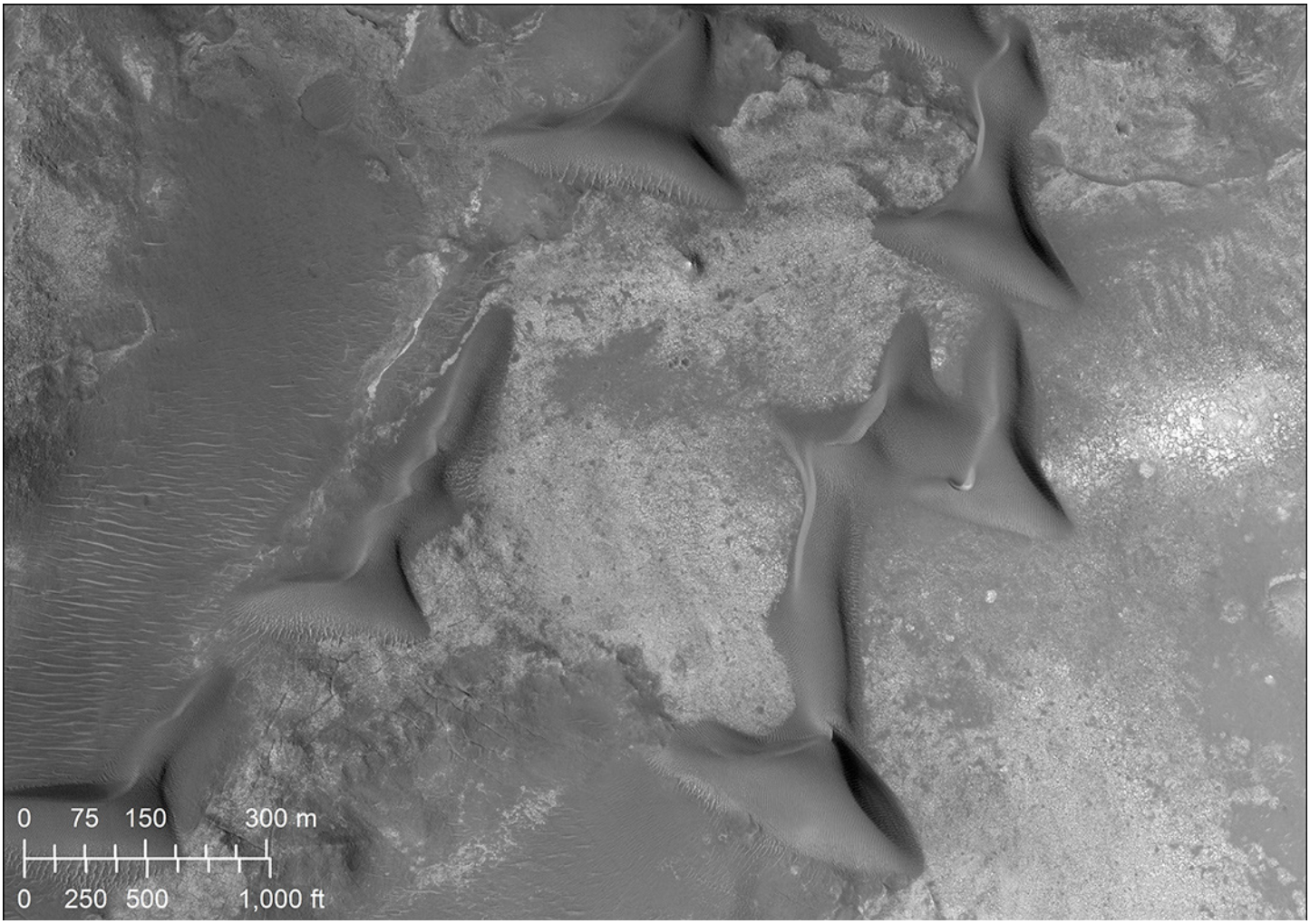


Nili Fossae - Images. Source: Context Camera (CTX)

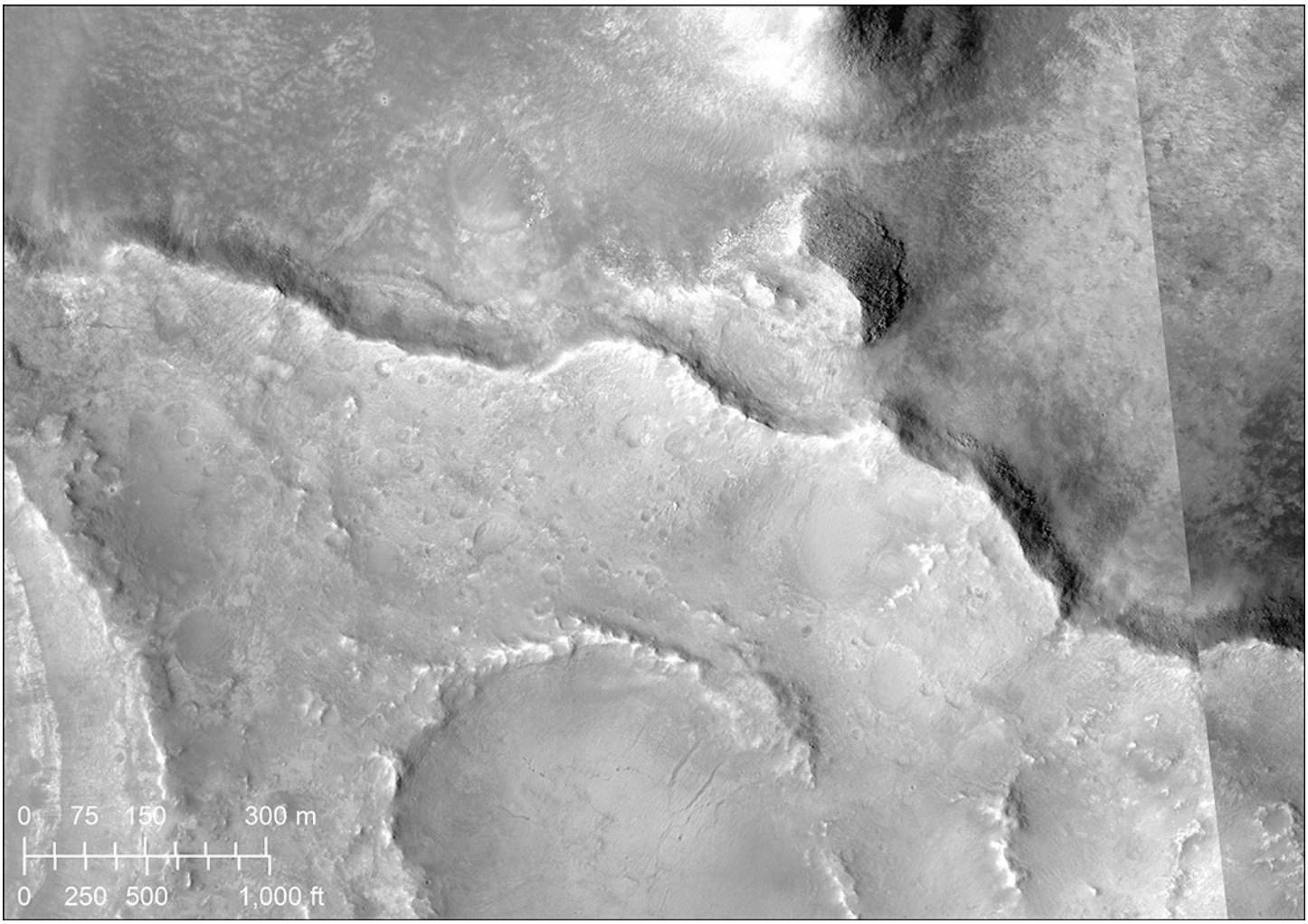
High Resolution Imaging Experiment (HiRISE) Data

Black and white very zoomed in images of the **Nili Fossae** site taken by the High Resolution Imaging Experiment (HiRISE) onboard the Mars Reconnaissance Orbiter.

Do not place an oval on these images.



Black and white image showing part of the Nili Fossae site. Several large sand dunes are visible: they look like shark teeth laying on sand. The bedrock beneath the dunes looks generally smooth. The image is 2.5 km across by 1.7 km tall.



Black and white image of part of the Nili Fossae site. A cliff extends from the upper left edge of the image to the lower right side. The cliff twists and curves, it is not straight. On the south side of the cliff the terrain is higher and has many small craters. A larger crater that looks like a ring of rugged rocks ~300 m in diameter is partially cut off by the bottom edge of the image. The image is 2.5 km across by 1.7 km tall.