USGS
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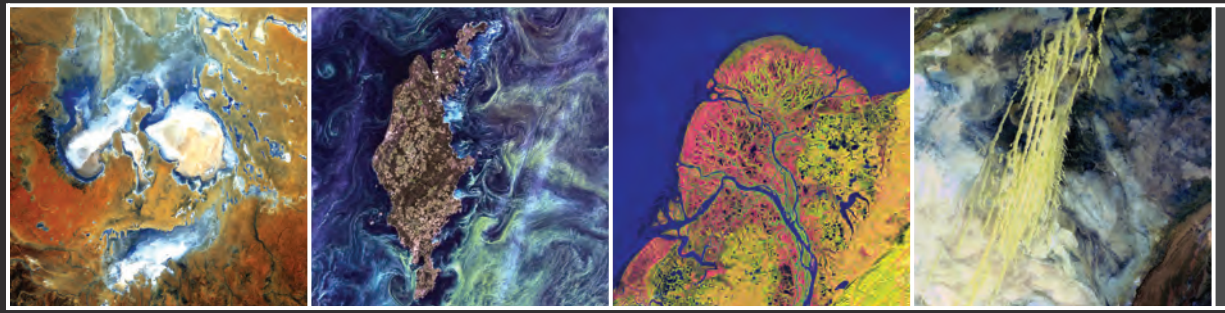
NASA

EARTH as art three



General Information Product 111

U.S. Department of the Interior
U.S. Geological Survey

For most of us, deserts, mountains, river valleys, coastlines—even dry lakebeds—are relatively familiar features of the Earth's terrestrial environment. For earth scientists, they are the focus of considerable scientific research. Viewed from a unique and unconventional perspective, Earth's geographic attributes can also be a surprising source of awe-inspiring art.

That unique perspective is space. The artists for the Earth as Art Three exhibit are the Landsat 5 and Landsat 7 satellites, which orbit approximately 705 kilometers (438 miles) above the Earth's surface. While studying the images these satellites beam down daily, researchers are often struck by the sheer beauty of the scenes. Such images inspire the imagination and go beyond scientific value to remind us how stunning, intricate, and simply amazing our planet's features can be.

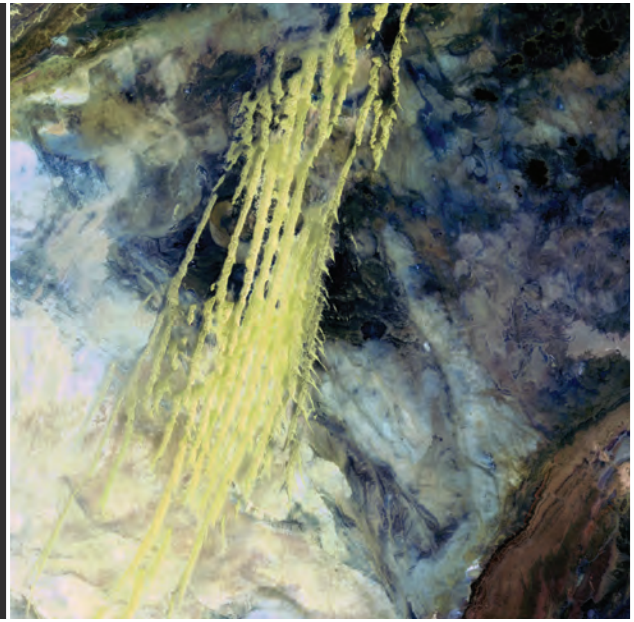
Instead of paint, the medium for these works of art is light. But Landsat satellite sensors don't see light as human eyes do; instead, they see radiant energy reflected from Earth's surface in certain wavelengths, or bands, of red, green, blue, and infrared light. When these different bands are combined into a single image, remarkable patterns, colors, and shapes emerge.

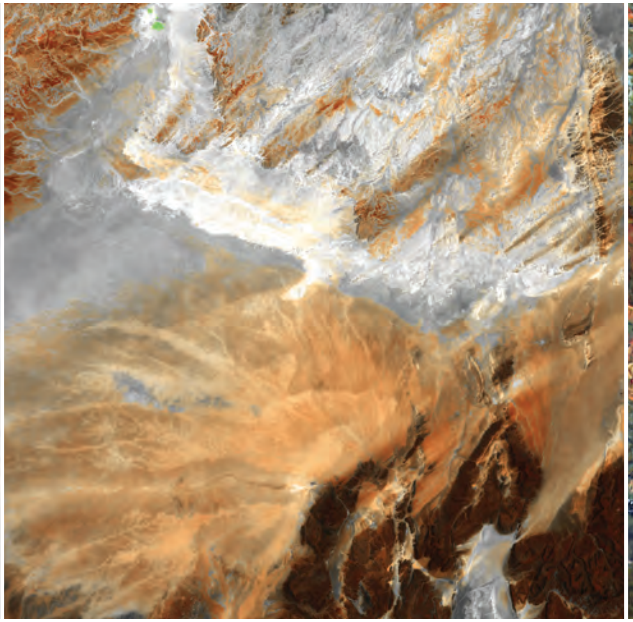
The Earth as Art Three exhibit provides fresh and inspiring glimpses of different parts of our planet's complex surface. The images in this collection were chosen solely based on their aesthetic appeal. Many of the images have been manipulated to enhance color variations or details. They are not intended for scientific interpretation—only for your viewing pleasure. Enjoy!

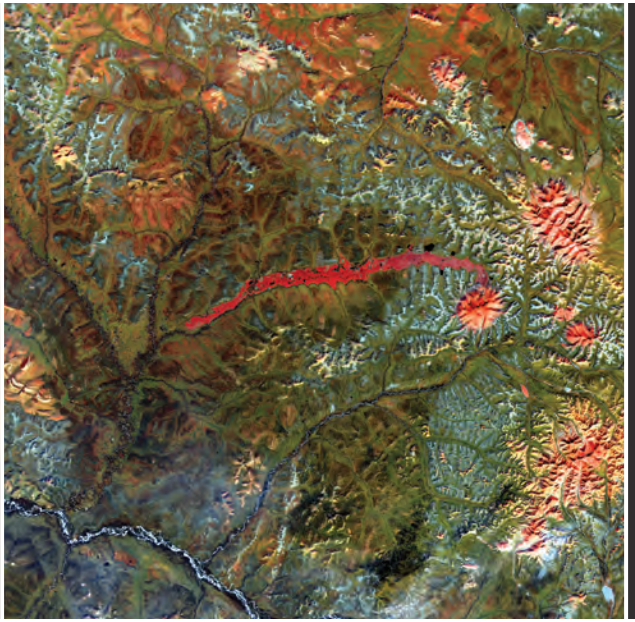
Algerian Abstract What look like pale yellow paint streaks slashing through a mosaic of mottled colors are ridges of wind-blown sand that make up Erg Iguidi, an area of ever-shifting sand dunes extending from Algeria into Mauritania in northwestern Africa. Erg Iguidi is one of several Saharan ergs, or sand seas, where individual dunes often surpass 500 meters—nearly a third of a mile—in both width and height.

Algerian Sahara This abstract in browns and grays from central Algeria shows that some parts of Africa's Sahara Desert contain much more than dunes of wind-blown sand. Barren ridges and fragmented mountains (lower right) border a vast expanse of arid plains etched with a complex system of dry streambeds. The streambeds contain water for brief periods following rare, intense rains that often cause flash floods.

Anyuyskiy Volcano The prominent crimson streak in the center of this image represents the remains of an extensive lava and mud flow. Its source is the currently dormant Anyuyskiy Volcano (orange circular shape at the right end of the streak) in northeastern Russia. Remote and largely inaccessible, the region is a rugged collection of towering volcanic peaks, steep valleys, and wild, snow-fed rivers and streams.



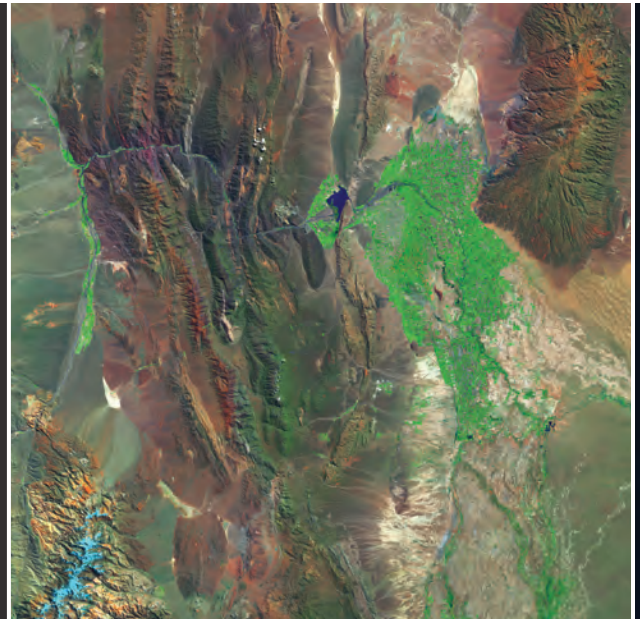


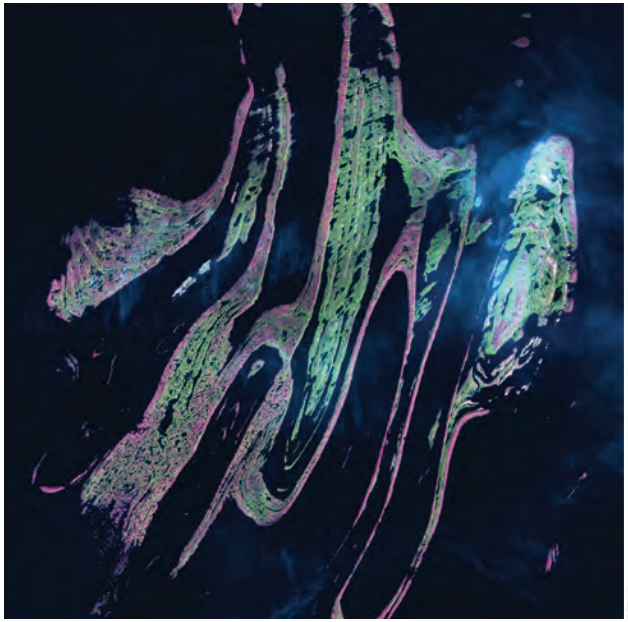


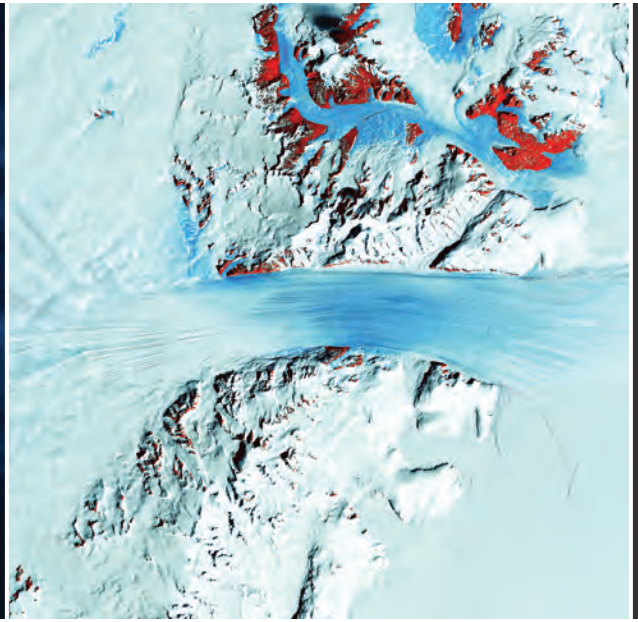
Barreal Blanco San Juan, Argentina, nestles in a fertile valley flanked by arid mountains. Croplands and vineyards (green) abut the metropolitan area on the San Juan River. The white "teardrop" (lower left) is an ancient lakebed called Barreal Blanco. It is one of the best places in the world for carrovelismo, or landsailing, thanks to the steady winds that sweep across this flat, unobstructed expanse of hard-packed sediment.

Belcher Islands Like sweeping brushstrokes of pink and green, the Belcher Islands meander across the deep blue of Canada's Hudson Bay. The islands' only inhabitants live in the small town of Sanikiluaq, near the upper end of the middle island. Despite the green hues in this image, these rocky islands are too cold to sustain more than a smattering of low-growing vegetation.

Byrd Glacier Truly a river of ice, Antarctica's relatively fast-moving Byrd Glacier courses through the Transantarctic Mountains at a rate of 0.8 kilometers (0.5 miles) per year. More than 180 kilometers (112 miles) long, the glacier flows down from the polar plateau (left) to the Ross Ice Shelf (right). Long, sweeping flow lines are crossed in places by much shorter lines, which are deep cracks in the ice called crevasses. The conspicuous red patches indicate areas of exposed rock.



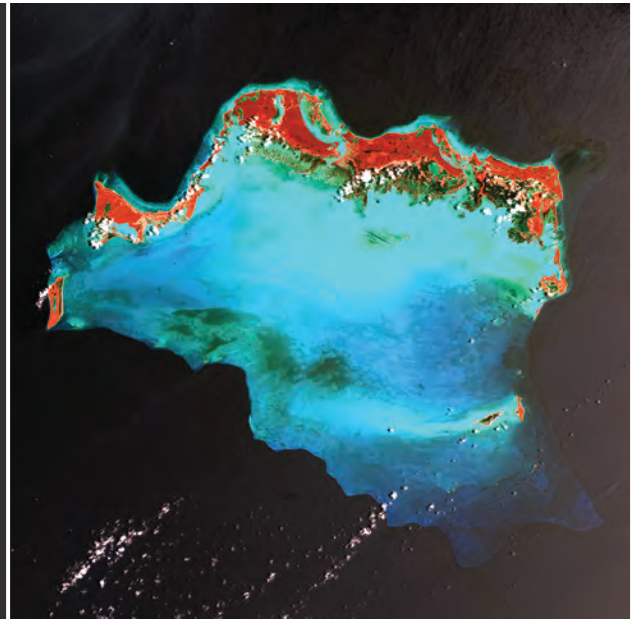


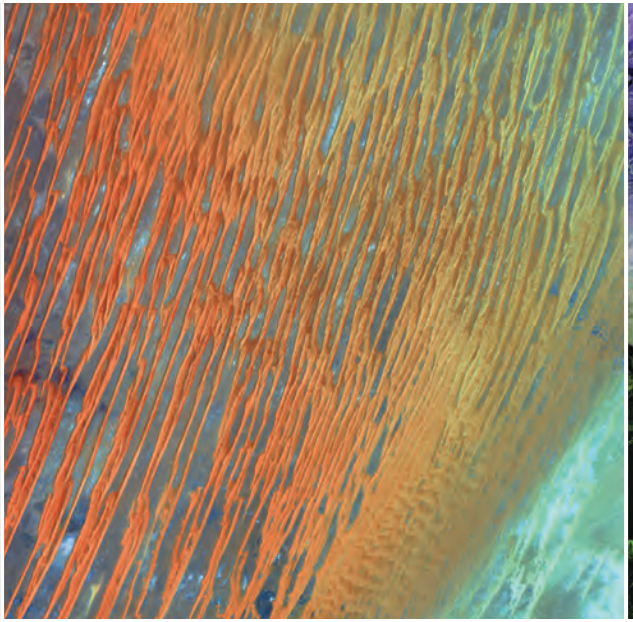


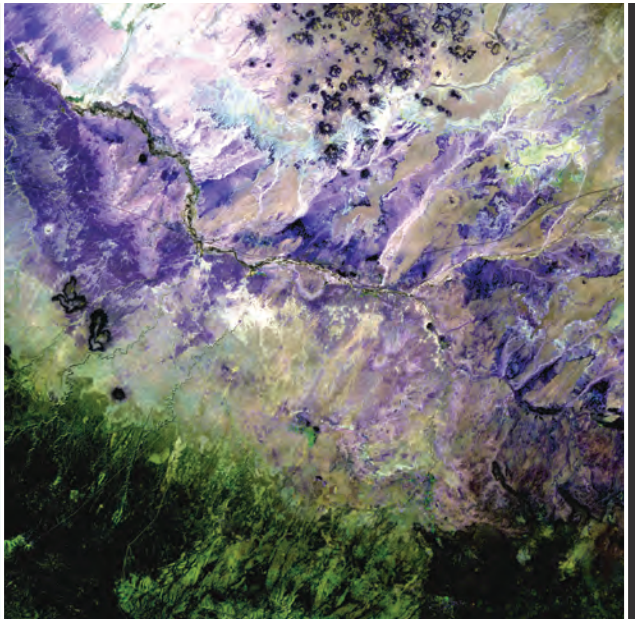
Caribbean Luxury The Caicos Islands (pronounced KAY-kohss) in the northern Caribbean are a popular tourist attraction, renowned for their beautiful beaches, clear waters, scuba diving, and luxury resorts. The islands lie primarily along the northern perimeter of the submerged Caicos Bank (turquoise), a shallow limestone platform formed of sand, algae, and coral reefs covering 6,140 square kilometers (2,370 square miles).

Desert Patterns Seen through the "eyes" of a satellite sensor, ribbons of Saharan sand dunes seem to glow in sunset colors. These patterned stripes are part of Erg Chech, a desolate sand sea in southwestern Algeria, Africa, where the prevailing winds create an endlessly shifting collage of large, linear sand dunes. The term "erg" is derived from an Arabic word for a field of sand dunes.

Desert to Forest In the American Southwest, transitions from one ecosystem to another can be dramatic and abrupt. This certainly is true in northern Arizona, USA, where the parched Painted Desert, shown here in a palette of purples, adjoins Sitgreaves National Forest (shades of green), a realm of pine woodlands with abundant wildlife. Within the Painted Desert lie the Hopi Buttes, a field of ancient volcanic cones, seen here as a scattering of dark, circular shapes near the top of the image.



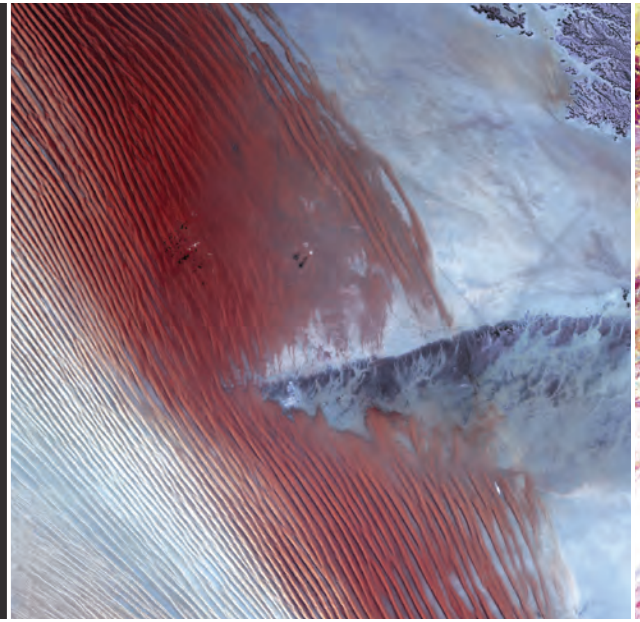


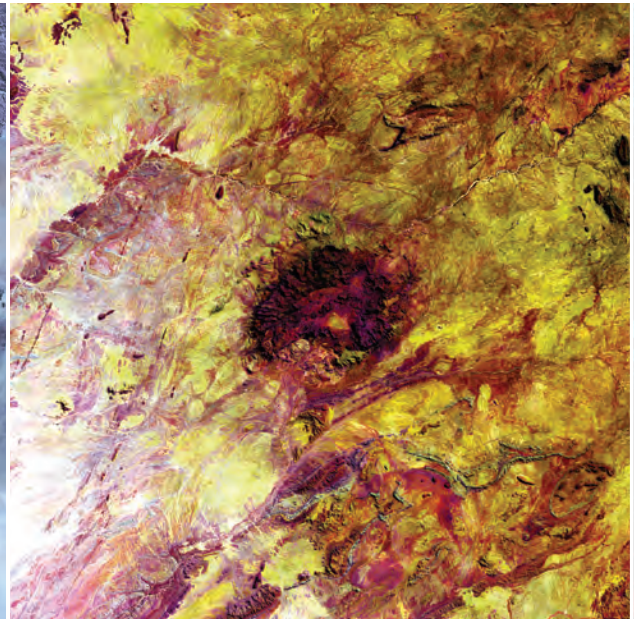


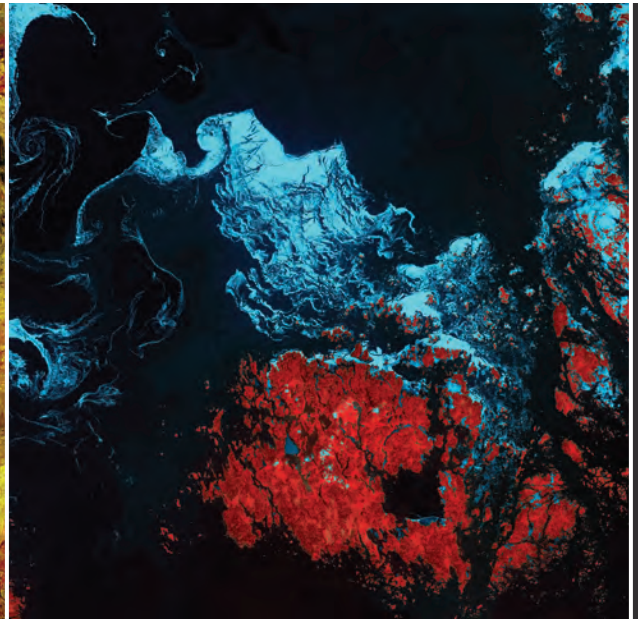
Empty Quarter White pinpricks of cloud cast ebony shadows on the Rub' al Khali, or Empty Quarter, near the border between Saudi Arabia and Yemen. The lines of wind-sculpted sand are characteristic of immense sand deserts, or sand seas, and the Rub' al Khali is the largest desert of this type in the world. A highland ridge is just high enough to disturb the flow of the lines. In the center of that interruption lies the Saudi Arabian town of Sharurah.

Erongo Massif The dark heart in this vivid African landscape is the Erongo Massif, an isolated, sheer-walled mountain that rises 1,200 meters (3,937 feet) above arid Namibian plains. The massif is a remnant of a gigantic volcano that was active roughly 150 million years ago. At some point, the volcano's center collapsed in upon itself under the weight of overlying lava. Eons of erosion by wind and wind-blown sand gradually exposed the long-dead volcano's core of granite and basalt.

Ghostly Grease Ice Ethereal swirls of grease ice appear turquoise against the midnight blue of the northern Baltic Sea near the Aland Islands (red) between Finland and Sweden. An early stage of sea ice formation, grease ice consists of a viscous mix of tiny ice crystals and resembles an oil slick on the ocean's surface. Wind and currents constantly shape and reshape grease ice into surreal, ghostly patterns.



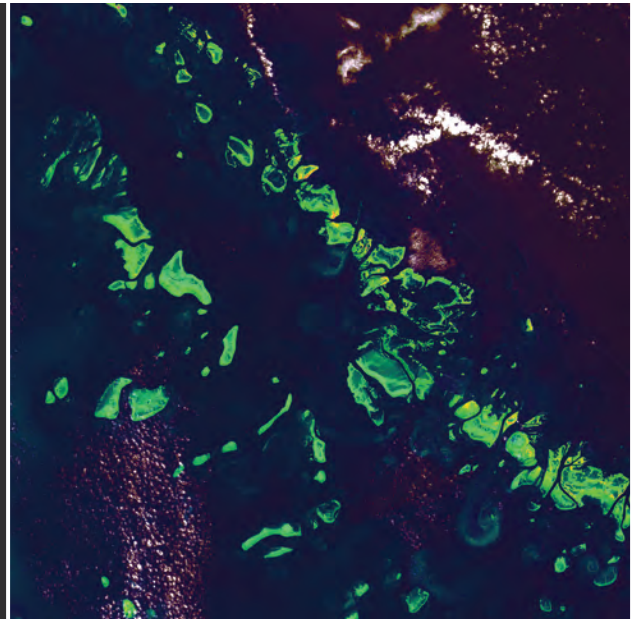


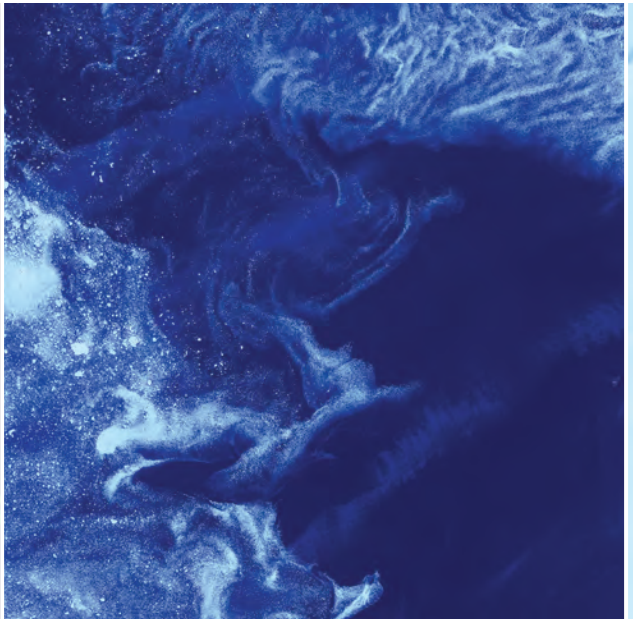


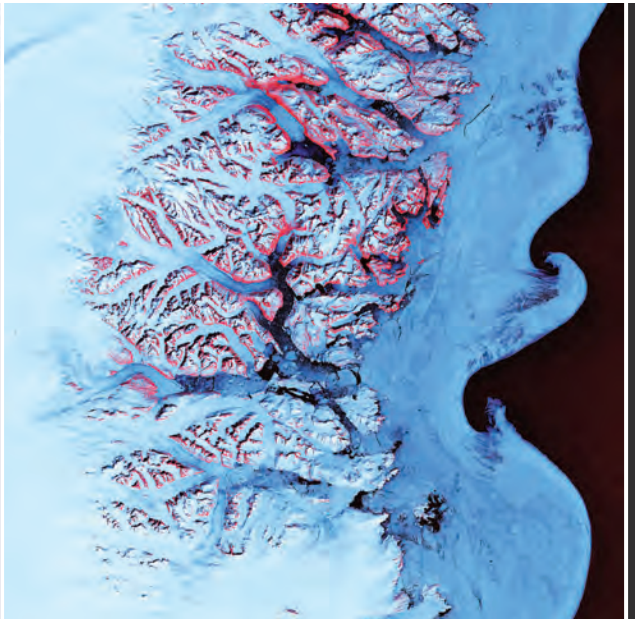
Great Barrier Reef What might be mistaken for dinosaur bones being unearthed at a paleontological dig are some of the individual reefs that make up the Great Barrier Reef, the world's largest tropical coral reef system. The reef stretches more than 2,000 kilometers (1,240 miles) along the coast of Queensland, Australia. It supports astoundingly complex and diverse communities of marine life and is the largest structure on the planet built by living organisms.

Ice Stars Like distant galaxies amid clouds of interstellar dust, chunks of sea ice drift through graceful swirls of grease ice in the frigid waters of Foxe Basin near Baffin Island in the Canadian Arctic. Sea ice often begins as grease ice, a soupy slick of tiny ice crystals on the ocean's surface. As the temperature drops, grease ice thickens and coalesces into slabs of more solid ice.

Ice Waves Along the southeastern coast of Greenland, an intricate network of fjords funnels glacial ice to the Atlantic Ocean. During the summer melting season, newly calved icebergs join slabs of sea ice and older, weathered bergs in an offshore slurry that the southward-flowing East Greenland Current sometimes swirls into stunning shapes. Exposed rock of mountain peaks, tinted red in this image, hints at a hidden landscape.



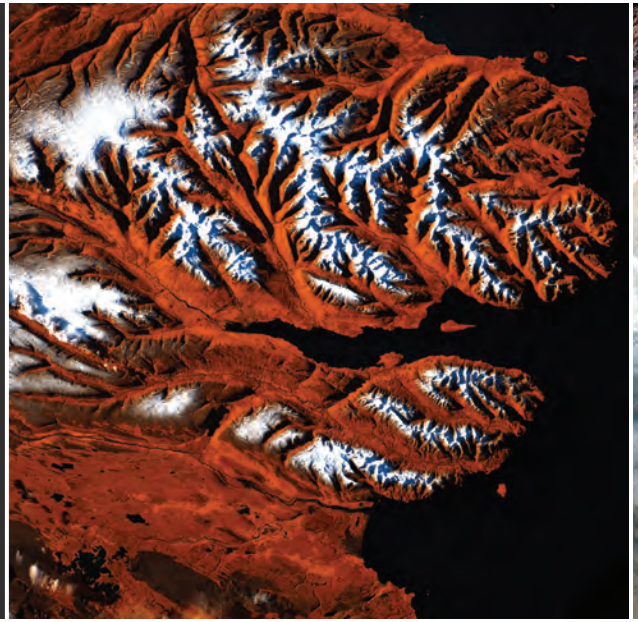




Icelandic Tiger This stretch of Iceland's northern coast resembles a tiger's head complete with stripes of orange, black, and white. The tiger's mouth is the great Eyjafjörður, a deep fjord that juts into the mainland between steep mountains. The name means "island fjord," derived from the tiny, tear-shaped Hrísey Island near its mouth. The ice-free port city of Akureyri lies near the fjord's narrow tip, and is Iceland's second largest population center after the capital, Reykjavik.

Impact Tin Bider is an ancient and eroded meteor crater on the Tin Rhert Plateau in the Algerian Sahara. Tin Bider is nearly 6 kilometers (3.7 miles) in diameter and was caused by a meteorite impact in this region of northern Africa roughly 70 million years ago. The other streaks near the crater are unrelated to the impact event. These rock folds are geologic features older than the crater.

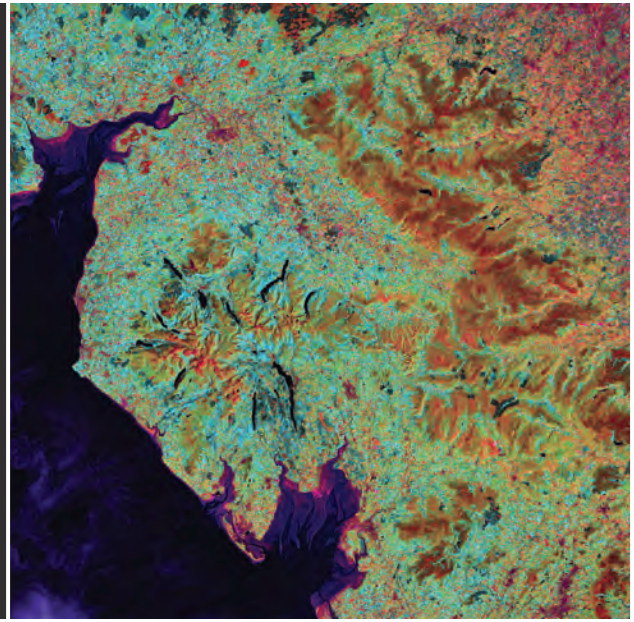
Island Rebound During the last ice age, Akimiski Island in Canada's James Bay lay beneath vast glaciers that pressed down with immense force. As the climate changed and the ice retreated, Akimiski began a gradual rebound. The island's slow but steady increase in elevation is recorded along its naturally terraced edges where the coastline seems etched with bathtub rings, the result of the rising landmass and wave action at previous sea levels.

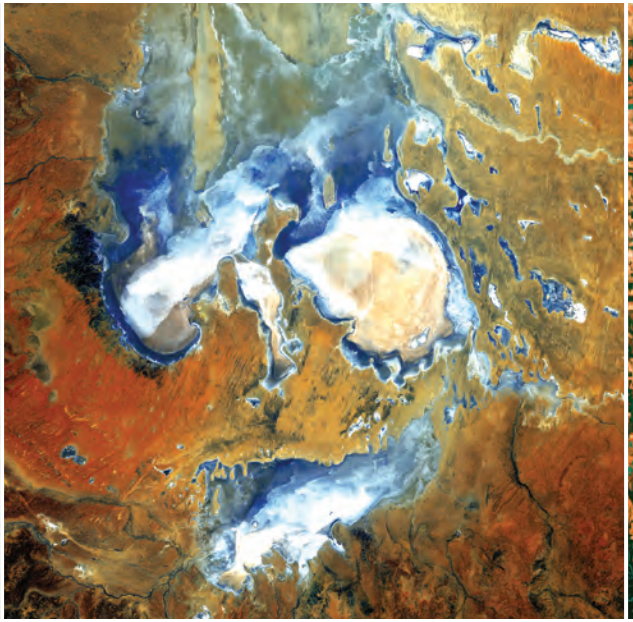


Lake District A popular holiday destination, the Lake District in northwestern England is a region of picturesque mountains and long, narrow lakes. Most of the lakes lie in U-shaped valleys that were carved by glaciers during the last ice age. Morecambe Bay, below the Lake District, opens into the Irish Sea. This large expanse of intertidal sand and mudflats is notorious for its quicksand and tides that are said to move "as fast as a horse can run."

Lake Eyre Do you see a scary face looking back at you? The hollow-appearing eyes, narrow nose, and slash of a mouth are inundated patches of shallow Lake Eyre (pronounced "air"). Deep in the desert country of northern South Australia, Lake Eyre is an ephemeral feature of this flat, parched landscape. When seasonal rains are abundant, water fills the lakebed to some degree. During the last 150 years, Lake Eyre has filled completely only three times. When brimming, it is Australia's largest lake.

Meandering Mississippi Small, blocky shapes of towns, fields, and pastures surround the graceful swirls and whorls of the Mississippi River. Countless oxbow lakes and cutoffs accompany the meandering river south of Memphis, Tennessee, on the border between Arkansas and Mississippi, USA. The "mighty Mississippi" is the largest river system in North America.

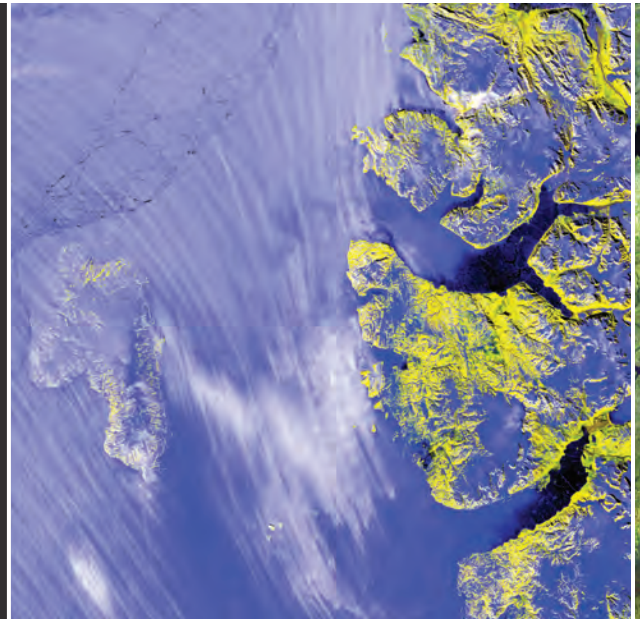


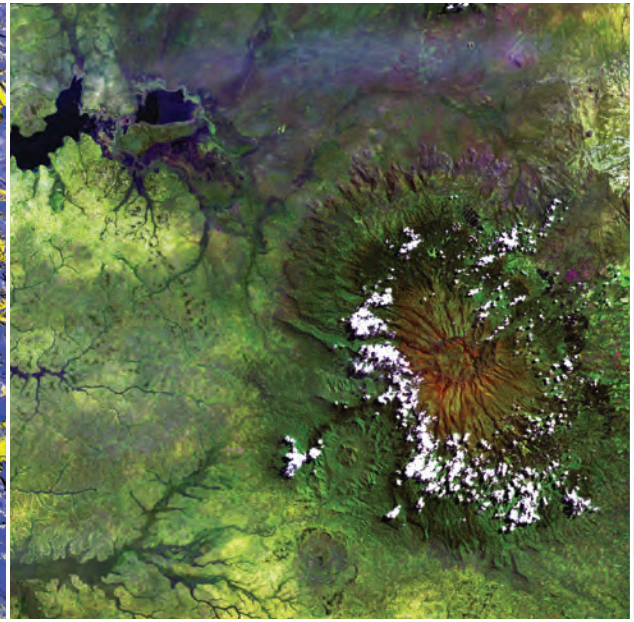


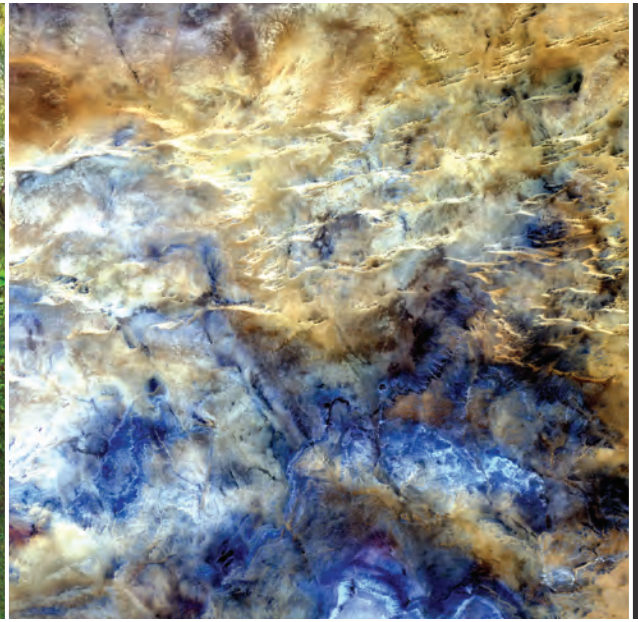
Meighen Island A veil of blowing snow nearly obscures Meighen Island (left) off the northern coast of Canada. Across the Sverdrup Channel lies the much larger Axel Heiberg Island, where glaciers (blue) huddle among mountain peaks (yellow) and flow into deep fjords. No evidence of human occupation has ever been found on Meighen Island.

Mount Elgon Clouds encircle the lofty rim of Africa's Mount Elgon, a huge, long-extinct volcano on the border between Uganda and Kenya. The solitary volcano has one of the world's largest intact calderas, a cauldron-like central depression. The caldera is about 6.5 kilometers (4 miles) across and formed following an eruption, when the emptied magma chamber collapsed under the weight of volcanic rock above it.

No Man's Land A study in shades of blue and brown is actually one of the harshest landscapes on Earth. This glimpse of Africa's Sahara Desert, located near where the borders of Mali, Niger, and Algeria converge, is truly a no man's land, a world of sand and rock without roads or settlements. The horizontal lines across the top half of the image are intrusions of igneous rock, where magma poked up to the surface from deep underground.



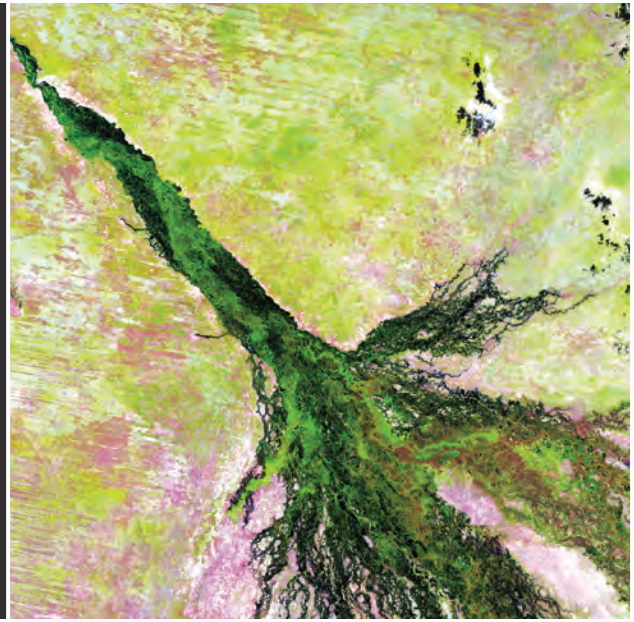


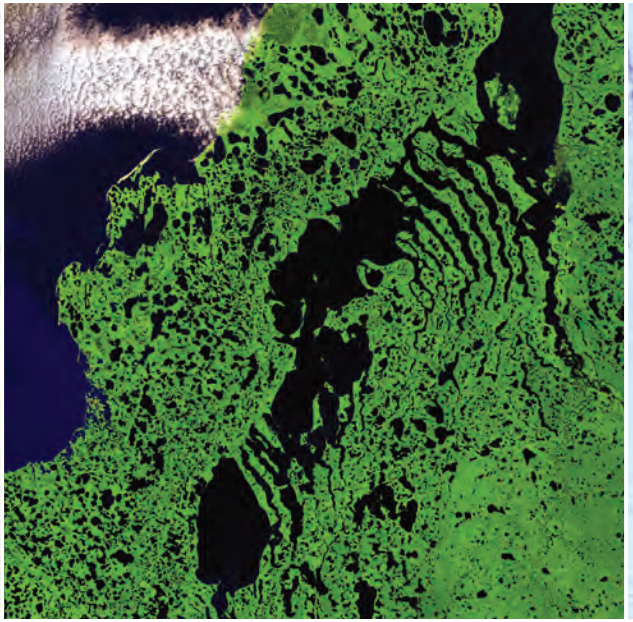


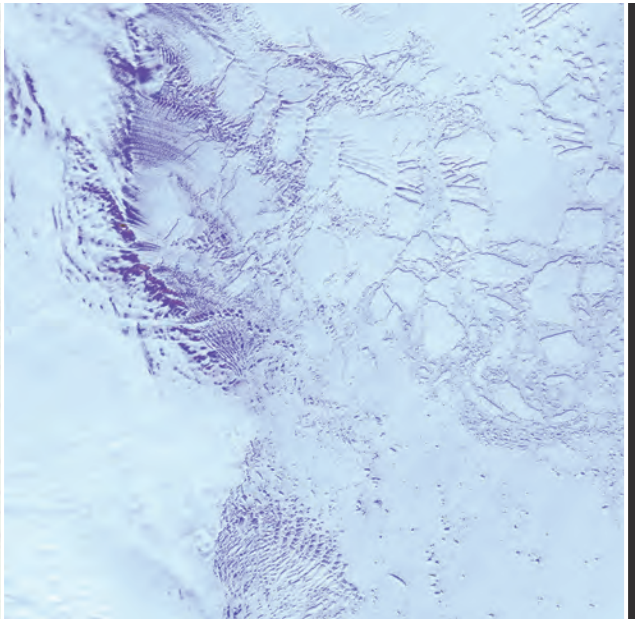
Okavango Delta Like a watercolor in which a brushstroke of dark green has bled into a damp spot on the paper, southern Africa's Okavango River spreads across the pale, parched landscape of northern Botswana to become the lush Okavango Delta. The delta forms where the river empties into a basin in the Kalahari Desert, creating a maze of lagoons, channels, and islands where vegetation flourishes, even in the dry season, and wildlife abounds.

Remote Tundra Skeletal extensions of land reach like bony fingers across a section of Liverpool Bay along the northern edge of Canada's Northwest Territories. Only small villages are thinly scattered in this remote and inhospitable region of Arctic tundra bordering the Beaufort Sea. The relatively flat landscape is dotted with shallow lakes during the extremely brief summer season.

Robinson Glacier Lines and shapes etched into the surface of Antarctica's Robinson Glacier hint at the slow but inevitable movements of this giant river of ice. Patterns of lines may be icefalls, where a glacier cascades over rock, or a series of crevasses, massive cracks that form as different parts of a glacier move at slightly different speeds. Robinson Glacier flows down to the continent's coast, where glacial ice meets mammoth slabs of sea ice caught in the frigid embrace of the Southern Ocean.



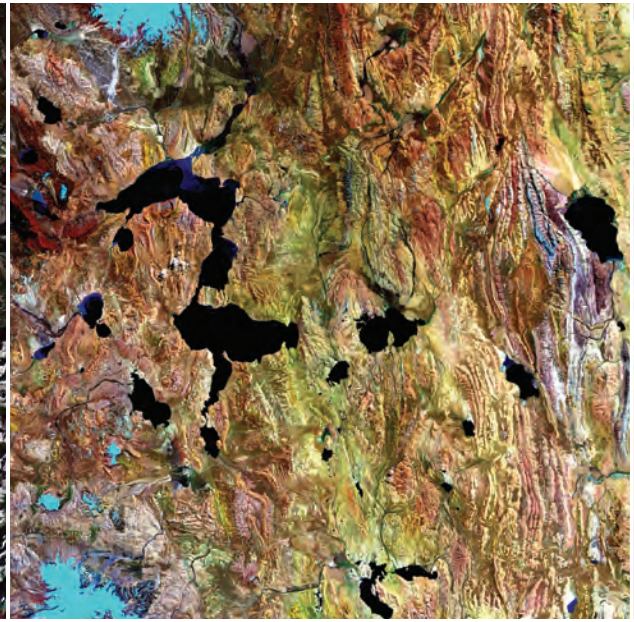


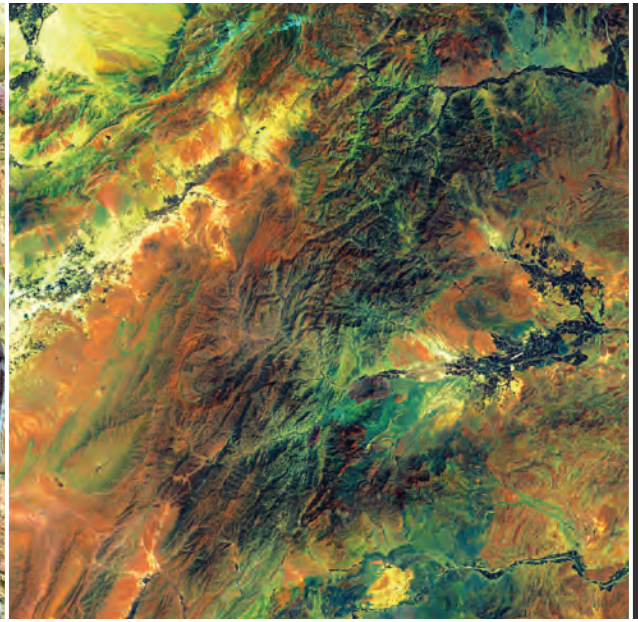


Rocky Mountain Trench What appears to be a stroke of thick red paint is actually a remarkable interplay of light and cloud in the Canadian Rockies. Angling through them is part of the Rocky Mountain Trench, a valley that extends from Montana, USA, to just south of the Yukon Territory. Low clouds filled a part of the Trench near the border between the Canadian provinces of Alberta and British Columbia. The light-reflecting nature of the clouds coupled with low sun elevation resulted in this startling effect.

Roof of the World Central Asia's Tibetan Plateau is justifiably nicknamed "the roof of the world"—its average elevation is more than 4,500 meters (14,764 feet). It is the world's highest and largest plateau, covering an area roughly four times the size of Texas. Tectonic forces have long shaped the Tibetan Plateau's crumpled and uplifted mountain ridges. This scene also features some of the area's deep, glacier-fed lakes. The two largest lakes in this scene are Migriggyangzham near the upper left and Dorsoidong just below it.

Rugged Terrain Hues of green and orange highlight the extreme ruggedness of the mountainous terrain in eastern Afghanistan, near its border with Pakistan. The dark green areas on the right side along rivers indicate agricultural areas. Snow-fed streams allow sufficient irrigation to transform relatively arid soils into productive fields.

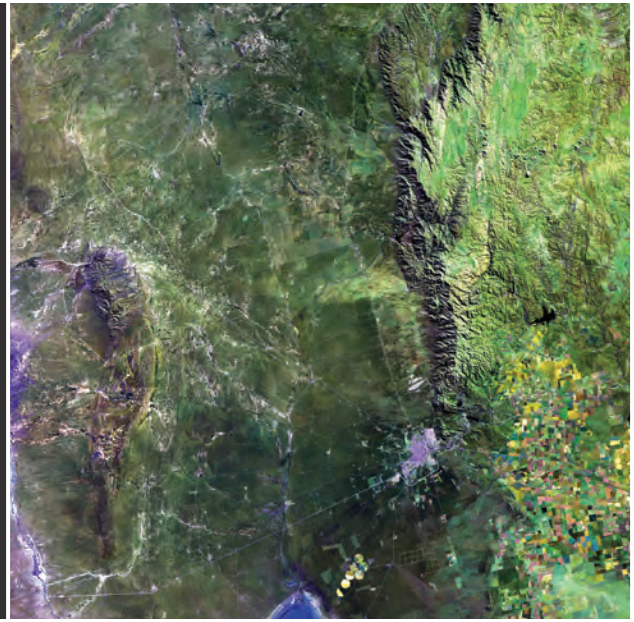


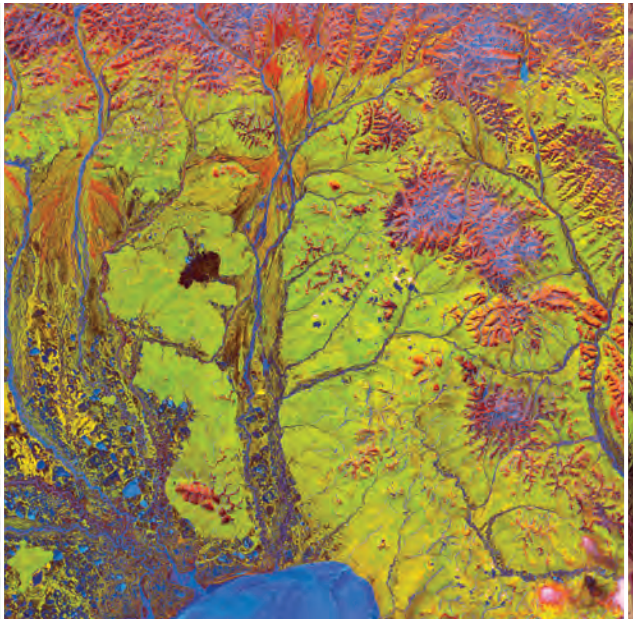


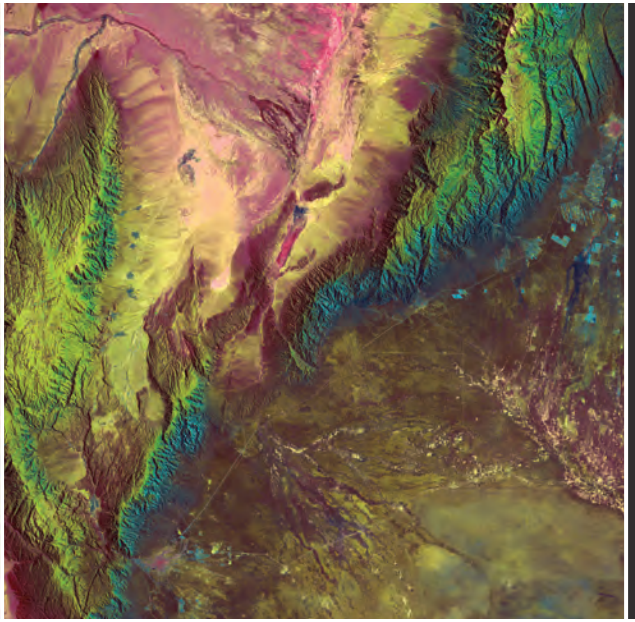
San Luis, Argentina Straight highways fan out like spokes on a wheel from the Argentine city of San Luis. To the right of the city are croplands that resemble colorful confetti. Founded in 1594, San Luis lies at the tip of the Sierra de San Luis and is largely surrounded by flat-to-rolling fertile plains.

Siberian Ribbons Vivid colors and bizarre shapes come together in an image that could be an imaginative illustration for a fantasy story. This labyrinth of exotic features is present along the edge of Russia's Chaunskaya Bay (vivid blue half circle) in northeastern Siberia. Two major rivers, the Chaun and Palyavaam, flow into the bay, which in turn opens into the Arctic Ocean. Ribbon lakes and bogs are present throughout the area, created by depressions left by receding glaciers.

Sierra de Velasco Shimmering blues and greens accentuate the textures of the Sierra de Velasco Mountains of northern Argentina. The urban area (pinkish circle) near the lower left part of the mountain range is La Rioja, the capital of the province of La Rioja. Follow the foothills to the upper right, where the city of San Fernando del Valle de Catamarca lies near extensive vineyards and fruit-growing areas (blue blocky shapes).



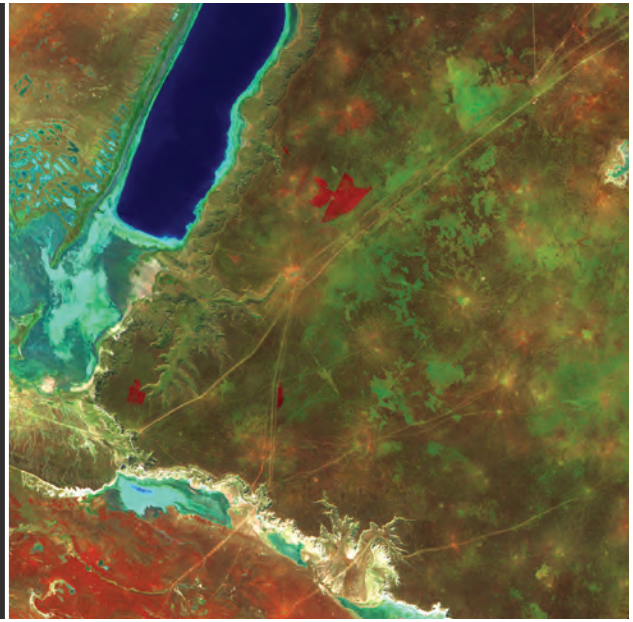


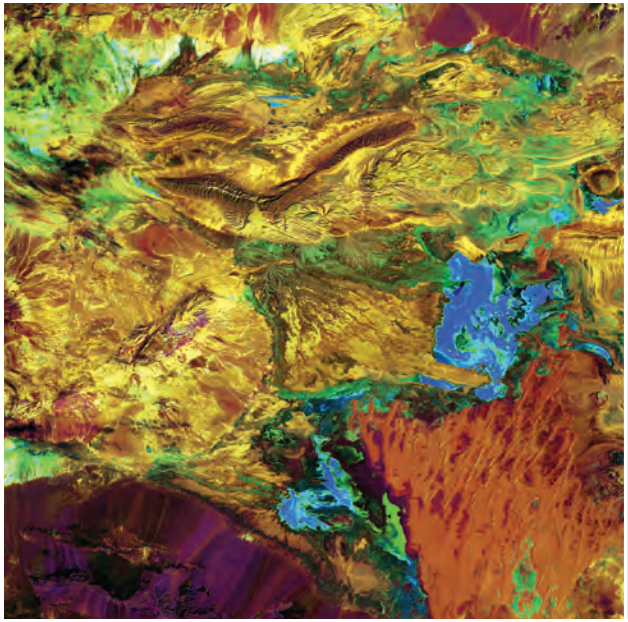


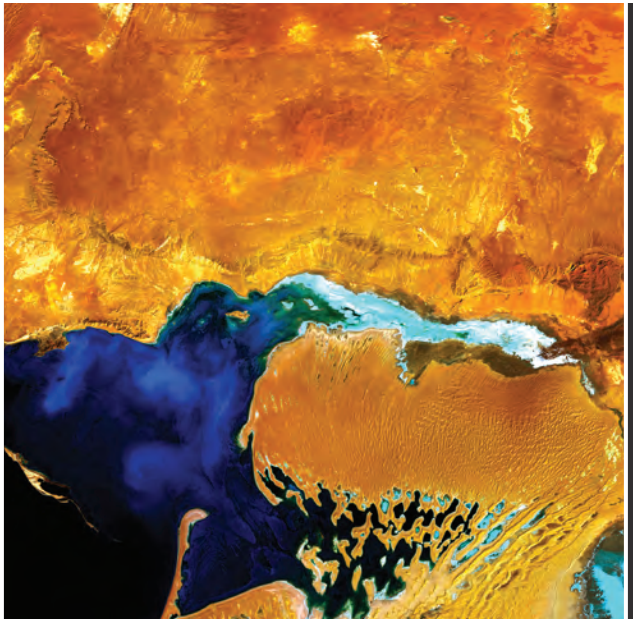
Sor Kaydak The intricate lines angling and criss-crossing over the landscape are roads in extreme southwestern Kazakhstan. The turquoise areas to the left are salt flats and marshes, some parts of which are submerged (dark blue). The water body is Sor Kaydak, which was once a gulf of the Caspian Sea. As water levels have dropped, curious patterns in the landscape emerged that reveal old tributaries.

Spilled Paint Like poster paints run wild, this image reveals an eclectic montage of landscapes in Iran's largest desert, the Dasht-e Kavir, or Great Salt Desert. The word kavir is Persian for salt marsh. The almost uninhabited region covers an area of more than 77,000 square kilometers (29,730 square miles) and is a mix of dry streambeds, desert plateaus, mudflats, and salt marshes. Extreme heat, dramatic daily temperature swings, and violent storms are the norm in this inhospitable place.

The Dardzha Monster Looking like a monstrous ogre with something gooey in its mouth, the Dardzha Peninsula in western Turkmenistan lies among the shallow coastal terraces of the Caspian Sea. Strong winds create huge sand dunes near the water, some of which are partly submerged. Further inland, the dunes transition to low sand plains.



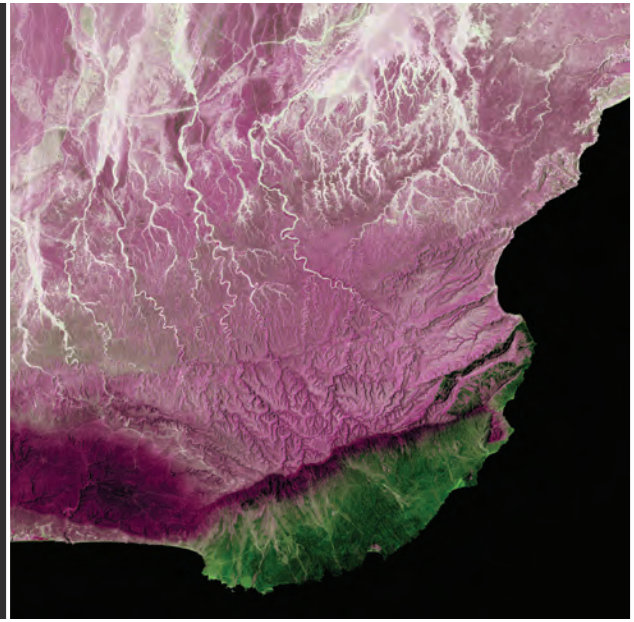


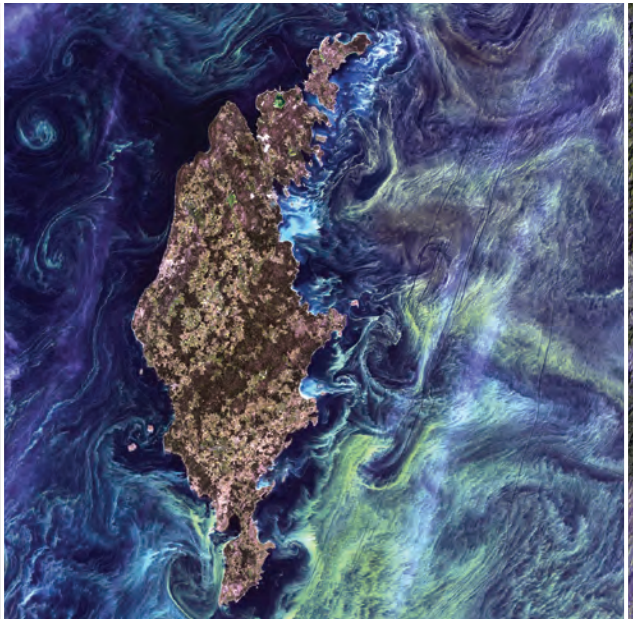


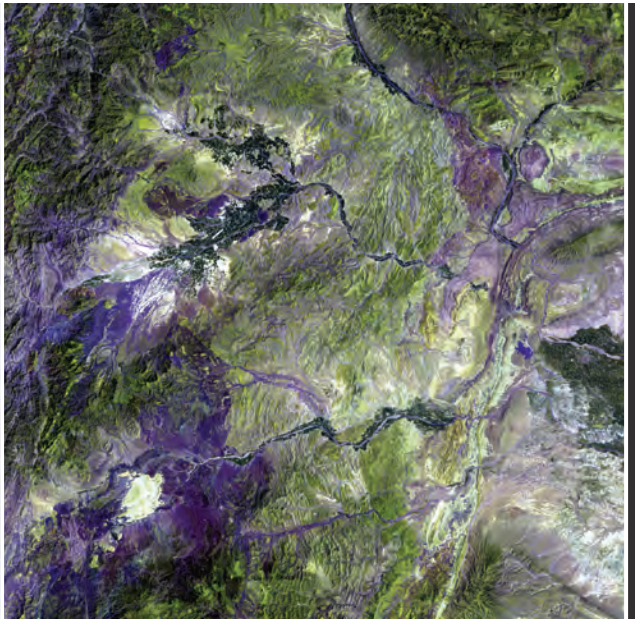
The Dhofar Difference Much of Oman is desert, but the Arabian Sea coast in the Dhofar region represents a startling difference in climate. This coastal region catches the monsoon rains, or khareef, during the summer months. Drenching rains fall primarily on the mountainous ridge that separates the lush, fertile areas along the coast from the arid interior, recharging streams, waterfalls, and springs that provide plentiful water supplies in the fertile lowlands for the remainder of the year.

Van Gogh from Space In the style of Van Gogh's painting "Starry Night," massive congregations of greenish phytoplankton swirl in the dark water around Gotland, a Swedish island in the Baltic Sea. Phytoplankton are microscopic marine plants that form the first link in nearly all ocean food chains. Population explosions, or blooms, of phytoplankton, like the one shown here, occur when deep currents bring nutrients up to sunlit surface waters, fueling the growth and reproduction of these tiny plants.

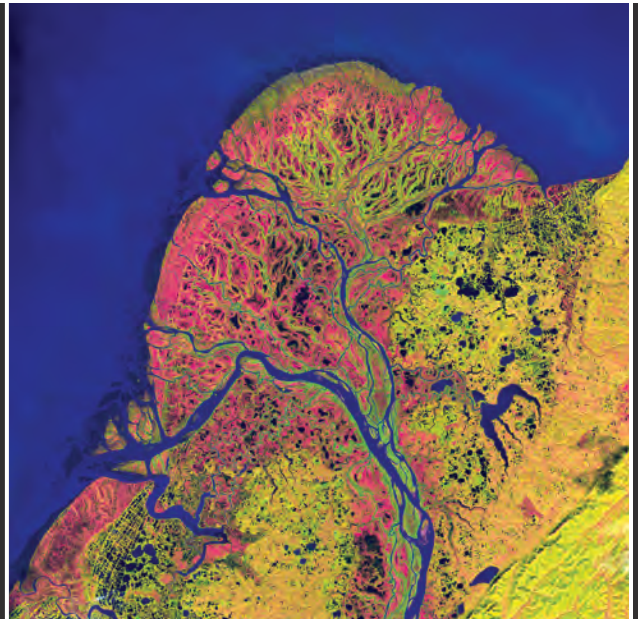
Waziristan Hills Deep purple and green hues enhance the Waziristan Hills, a mountainous region of northwest Pakistan near the Afghanistan border. A formidable landscape, the Waziristan Hills are a hodgepodge of steep, rugged hills split by narrow passes and deep gorges. Rivers coursing down from the mountains provide water for agriculture in a region of scanty rainfall.

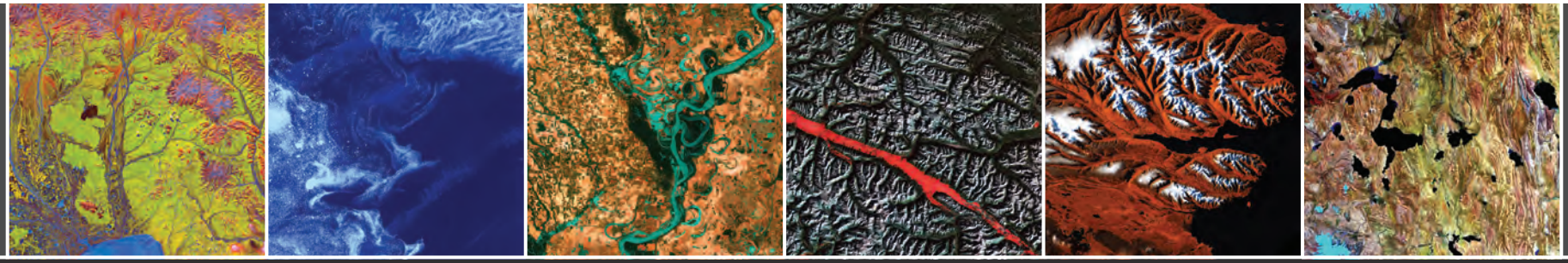






Yukon Delta After beginning in northern British Columbia and flowing through Yukon in Canada, the Yukon River crosses Alaska, USA, before emptying into the Bering Sea. Countless lakes, sloughs, and ponds are scattered throughout this scene of the Yukon Delta. The river's sinuous, branching waterways seem like blood vessels branching out to enclose an organ. It is one of the largest river deltas in the world, and currently (2010) protected as part of the Yukon Delta National Wildlife Refuge.





Contact for additional information

U.S. Geological Survey
Earth Resources Observation
and Science (EROS) Center

47914 252nd Street
Sioux Falls, SD 57198-0001

Tel: 800-252-4547
Tel: 605-594-6151
Fax: 605-594-6589

E-mail: custserv@usgs.gov
Web: http://eros.usgs.gov

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