Water is a Force of Change

Hurricane Bonnie, Atlantic Ocean

Nile River Delta/Sinai Desert

Glaciers in the Andes Mountains

Mouth of the Amazon River
As we look at Earth from the vantage point of outer space, we can’t but help notice how important water is to Earth’s surface. Three quarters of
our planet is covered with liquid and frozen water. The land surface is shaped by water's movements. Living things need water for survival.
Water exists as vapor in the atmosphere and is the stuff of clouds. As a renewable resource, water transforms through three states of matter—
solid, liquid, and—gas as it cycles from the oceans to the atmosphere, to the land, and back to the oceans. Water and its effects are the dominant
features Space Shuttle astronauts see from space. Water is a powerful force of change.

Upper left: Hurricane Bonnie, Atlantic Ocean (STS 47-151-618)
Among the most destructive forces of nature, hurricanes and
typhoons are driven by the Sun's heath and act as a great pressure
relief valve for Earth's atmosphere. The view of Hurricane Bonnie
was captured by the Crew of STS-47 as the storm swirled about 800
kilometers away from Bermuda near 35.4 degrees north latitude and
56.8 degrees west. At this stage in its life, Hurricane Bonnie has
well-developed eye where air currents are relatively calm. Window
reflections are visible on the right side of the picture.

Upper right: Nile River Delta/Sinai Desert (STS 50-153-020)
The presence and the absence of water are both clearly seen in this
STS-50 view of the Sinai Peninsula from the Nile river into Iraq. The
Fayum Depression, the well-watered valley of the lower Nile, and the
fertile Nile Delta are dark in contrast to the lighter orange and yellow
of the surrounding desert. The boundary between the light desert
and darker brush land marks the Egypt-Israel border. Other color
variations are caused by differences in bedrock composition and
weathering.

Lower left: Glaciers in the Andes Mountains (STS 48-151-074)
Although much slower as an agent of change than is running water,
mountain glaciers dramatically alter the land as the ice in them slow-
ly flows to lower elevations. Wrenching rock and soil from valley
floors and walls, glaciers sculpt the land as they deposit sediment at
their lower end. In this STS-48 picture, some of the most dramatic
landscape in the Americas is seen. The Andes mountain range near
Patagonia, Argentina is partly covered by a permanent ice cap that is
part of the Los Glacieres National Park. One glacier is seen cutting
off an arm of Lake Argentina (top). Water backs up behind the glaci-
er and eventually gives way in spring in a thunderous burst that can
be heard as far as 40 kilometers away.

Lower right: Mouth of the Amazon River (STS 46-80-009)
Though slow-moving at its mouth, the Amazon River has deposited
millions of cubic meters of sediment into the Atlantic Ocean. Up
river, heavy tropical rains cover the Amazon Basin and wash away
thin tropical topsoil to the sea. Converting rain forest to agricultural
land aggravates the erosion. The sediment plume from the river
extends past the delta, built up of deposited sediment, and bends to
the north to hug the coast. The plume is driven northward by the
west by northwest Guyana Current. The large island of Marajo is
partly visible through the widespread scattered cloud cover. The
structure to the side of the picture is the remote manipulator system
arm of the Shuttle orbiter.

Space Shuttle Earth Photography
A videodisc containing over 91,000 images of Earth taken by Space Shuttle astronauts is available for a modest charge from NASA CORE, Lorain
County Joint Vocational School, 15181 Route 58 South, Oberlin, OH 44074. The images on the disk contain all Earth-looking still images taken
during the STS-1 through STS-44 missions. A computer data base listing image data is available for both DOS and Macintosh formats.