Outline of Science of Earth's Water
November 13, 2012

Contents

Note: To look up references, see the Consciousness Bibliography, listing 10,000 books and articles, with full journal and author names, available in text and PDF file formats at http://www.outline-of-knowledge.info/Consciousness_Bibliography/index.html.

PHYS>Earth Science>Water

water on Earth
Water {water, Earth} includes ocean and fresh water. Water is 0.001% of Earth mass.

PHYS>Earth Science>Water>Fresh

fresh water
Water {fresh water} is where rainfall is plentiful or snow accumulates. People require five gallons of fresh water a day. In USA, people use 60 gallons per person per day.

drought
Rainfall can be small for long period {drought}|.

irrigation
Field can receive water from source {irrigation}|. Irrigation by dribbling has less evaporation than spraying or flooding.

PHYS>Earth Science>Water>Fresh>Areas

basin
enclosed water area {basin}|.

paddy
flooded or irrigated rice field {paddy}.

PHYS>Earth Science>Water>Fresh>Areas>Ice

floe

large flat iceberg {floe}|.

pack ice
large floating ice blocks {pack ice}|, from ice field.

PHYS>Earth Science>Water>Fresh>Areas>Marsh

marsh
wetland {marsh}|.

bayou
river or lake marsh {bayou}|.

bog
marsh {bog}|.

fen
bog or marsh {fen}|.

wash
In England, tides cause marshes {wash}|. Southwest USA has dry stream beds.

PHYS>Earth Science>Water>Fresh>Areas>River

river
Streams and rivers {river, water} receive water directly from rain and indirectly from water runoff from land. Streams are usually wider than they are deep, and erosion sediments can fill them within years. Stream first erodes into valley. Then tributaries enter valley and join first stream. Then valley sides wear down to make wide valley or wear back to make deep valley.

delta of river
Undertows pull sediment from rivers out to sea. River mouths have sediment triangles {delta}|. Mississippi River makes 600,000,000 tons each year. In sea, corals use minerals, or minerals precipitate out, as at Hudson-River mouth and in Baltic Sea.

eddy
circular river current {eddy}|.

ford
shallow river area {ford}|, where people or horses can cross.

freshet
Stream can enter salt water, or stream can have sudden flow {freshet}|.

headwaters
river beginning {headwaters}|.

meander river
Rivers curve many times {meander}| if banks are soft, because river cuts away outer bank, deposits soil on inner bank, and widens all curves. Rivers run straight and cut through rock if banks are hard, to make canyons.

rill
rivulet {rill}|.

rivulet
stream {rivulet}|.

tributary
Rivers {tributary}| can flow into larger river.

PHYS>Earth Science>Water>Fresh>Areas>River>Falls

falls
In stream, hard rock plate {falls}| can persist after lower rock has eroded.

cascade
waterfall series {cascade}|.

cataract of river
big waterfall {cataract, water}|.

rapids
Stream or river shallow parts can have rocks resistant to erosion, where water flows faster {rapids}|.

white water
rapids {white water}|.

PHYS>Earth Science>Water>Fresh>Areas>Spring

spring of water
water {spring, water}| burbling from ground.

geyser
Warm water from Earth interior can make hot water spouts {geyser}| that erupt several times a day.

thermal spring
hot spring {thermal spring}|.

warm springs
Warm water {warm springs}| can come from underground.

PHYS>Earth Science>Water>Fresh>Cave

cave
Groundwater can dissolve carbon dioxide to make carbonic acid, which can dissolve rock {cave}|.

karst
Landscapes {karst} can have caves and sinkholes.

sinkhole
Carbonic acid can dissolve limestone to make holes {sinkhole}| and collapsed ground in flat areas.

stalactite
In cave, dripping water can dry and precipitate carbonates, to make up-pointing structures {stalactite}|.

stalagmite
In cave, dripping water can dry and precipitate carbonates, to make down-pointing structures {stalagmite}|.

PHYS>Earth Science>Water>Fresh>Mechanical

desalination

Distillation or freezing can remove seawater salt {desalination}|. If water has low salt, reverse osmosis, electrodialysis, or ion exchange can remove salt.

reverse osmosis
High pressure can force water through membrane that retains salts {reverse osmosis}|, making purer water come out. If water has low salt, reverse osmosis, electrodialysis, or ion exchange can remove salt.

PHYS>Earth Science>Water>Fresh>Soil

aquifer
Porous and permeable rock {aquifer}| can hold water.

artesian well
Wells {artesian well}| can reach water table.

groundwater
Soil and rock water {groundwater}| depends on precipitation, evaporation, rock porosity, and soil permeability.

water table
Water-saturated-rock upper-surface level {water table}| is same as nearby lake and pond surface level.

PHYS>Earth Science>Water>Fresh>Soil>Spaces

infiltration
Soil water permeability and movement {infiltration}| is most for sand, middle for loam, and least for clay.

permeability of soil
Water infiltration is most for sand, middle for loam, and least for clay {permeability, soil}|.

porosity
Below soil, rainwater goes into rock-crystal open spaces {porosity}|, down to 100,000 feet.

PHYS>Earth Science>Water>Ocean

ocean
Oceans {ocean} have salt water and currents.

El Nino
Upwelling water can cause tropical Pacific Ocean warming {El Niño}|, every six years.

La Nina
Downward flowing water can cause tropical Pacific Ocean cooling {La Niña}|.

salinity
Ocean has 0.9% salt concentration {salinity}|.

PHYS>Earth Science>Water>Ocean>Areas

comber
long-wave breaker {comber}|.

cove
small bay {cove}|.

current in ocean

Ocean has water flows {current, ocean}|. Surface currents flow in same direction as wind. Beneath them, surface ocean currents have colder-water counter-currents flowing more slowly in opposite direction.

names

Gulf Stream flows along North-America east coast.
Labrador Current flows past Iceland to England.
Peru or Humboldt Current flows along South-America west coast.
California Current flows along North-America west coast.
Kuroshio Current flows off Japan.
Brazil Current flows along South-America east coast.
Besquela Current flows along Africa west coast.
Antarctic Circumpolar Current (ACC) circles Antarctica and keeps tropic waters out.

drift in ocean

Ocean has surface currents {drift, ocean}|.

firth

narrow inlet {firth}|.

main as ocean

open ocean {main}|.

rip current

fast outward current {rip current}|.

riptide

fast outward beach current {riptide}|.

strait in ocean

water area {strait}| between islands, allowing passage.

vortex

whirlpool {vortex, water}|.

whirlpool

Intersecting currents cause swirling water {whirlpool}|.

PHYS>Earth Science>Water>Ocean>Coast

coast

Sea meets land {coast, ocean}.

bay of sea

Sea can make small coastline indentations {bay}|.

estuary

At shore, low valleys {estuary}| can fill with rising water.

inlet

narrow bay {inlet}|, or narrow area between two islands.

fjord

At shore, steep glacier valleys {fjord} can fill with rising waters.

gulf

Sea can make big coastline indentations {gulf}|.

lagoon
Oblique currents and waves create beaches, sandbars, and spits on shore, and make offshore sandbars if beach has shallow slope. Quiet water {lagoon}| can be between a sandbar and shore.

littoral tidal
Sea has a region {littoral}| between high and low tides.

sound in ocean
Water {sound, shore} can be between island and shore.

PHYS>Earth Science>Water>Ocean>Floor Zones

ocean floor zones
Ocean zones {ocean floor zones} relate to light. 0 to 600 feet has sunlight. 600 to 4000 feet has twilight. 4000 to 36,000 feet is dark. Deepest trench is 36,000 feet deep.

abyssal plain
Sea floor {abyssal plain} is 34 F and has 1000-atmosphere pressure.

continental shelf
Under-sea continent region {continental shelf}| is 8% of ocean and is 400 to 600 feet deep.

continental slope
Continental shelf goes down to sea floor {continental slope}.

PHYS>Earth Science>Water>Ocean>Tide

tide
Moon and Sun gravitation moves Earth sea and land {tide}|. Earth gravity and land-and-sea elasticity oppose tides. Shallow-water tide motion makes heat by friction, which takes energy from Earth rotational energy. Earth rotation slows, making each day slightly longer. Earth-Moon distance increases slightly each day.

high tide
When Moon is overhead or on opposite side of Earth, continents rise up to six inches and oceans rise several feet {high tide}.

low tide
When Moon is to right or left, continents and oceans are at low height {low tide} {slack tide}.

neap tide
When Moon is overhead or on opposite side of Earth and Sun is to right or left, high tides {neap tide}| are lower, at first-quarter or third-quarter moon.

spring tide
When Moon and Sun are both overhead or opposite sides of Earth, tide {spring tide}| is extra high, at new or full moon.

tidal range
Difference {tidal range} between high and low tide is 2 feet in sheltered bays, 5 to 10 feet on open coast, and 30 to 50 feet in V-shaped bays. Tidal currents flow 5 to 10 miles per hour.

PHYS>Earth Science>Water>Ocean>Wave

wave on ocean
Winds cause waves {wave, ocean}|. Wave height and distance increase with wind speed, wind duration, and distance wave has traveled.

breaker
Sea bottom near shore slows wave bottom, and top wave part becomes narrow and falls over {breaker}|, where water level becomes less than wave height.

tidal wave
Small swells can superimpose to make big wave {tidal wave}|.

undertow
Wave water flows back to ocean along bottom {undertow}|.

whitecap
Strong winds cause open-water waves {whitecap}| to break.