

TIDES

FACTS:

RESULT FROM THE GRAVITATIONAL PULL BETWEEN THE EARTH, SUN, AND MOON

GRAVITATIONAL ATTRACTION BETWEEN TWO BODIES IS:

- A. PROPORTIONAL TO THE PRODUCT OF THEIR MASSES
- B. INVERSELY PROPORTIONAL TO THE SQUARE OF THE DISTANCE BETWEEN THEM

LAW OF GRAVITY

EVERY PARTICLE IN THE UNIVERSE ATTRACTS EVERY OTHER PARTICLE WITH A FORCE THAT IS DIRECTLY PROPORTIONAL TO THE PRODUCT OF THEIR MASSES AND INVERSELY PROPORTIONAL TO THE SQUARE OF THE DISTANCE BETWEEN THEM.

$$F = Gm_1m_2/R_2$$

G is a constant $6.670 \times 10^{-11} \text{N-m}^2/\text{kg}^2$

- THE MOON IS CLOSER TO THE EARTH THAN THE SUN
(EARTH/SUN)
(1/400)
- THE SUN'S MASS IS 27,000,000 TIMES GREATER THAN THE MOON'S MASS
- LUNAR TIDE OCCURS EVERY 24 HOURS AND 50 MINUTES
- THE LUNAR MONTH IS 27.5 DAYS

TIDES ARE THE RESULT OF THE COMPLEX INTERACTION OF THE FOLLOWING:

1. MOVEMENT OF THE MOON IN RELATION TO THE EARTH'S EQUATOR
2. SUN AND MOON POSITION CHANGES IN RELATION TO THE EARTH
3. VARIATION OF WATER DISTRIBUTION OVER THE EARTH IRREGULARITY OF COASTLINES AND

OCEAN BASINS

HIGH TIDE - HIGHEST WATER LEVEL

LOW TIDE - RETREAT TO THE LOWEST WATER LEVEL

TIDAL RANGE - VERTICAL DISTANCE BETWEEN HIGH AND LOW TIDE

TIDAL PERIOD - TIME BETWEEN SUCCESSIVE HIGH OR LOW TIDES
(24 HOURS AND 50 MINUTES)

ASTRONOMICAL TIDES - RESPONSE TO MOVING SUN AND MOON
*THEORETICAL TIDES

METEOROLOGICAL TIDES - RESPONSE TO WIND AND WEATHER CONDITIONS
*ACTUAL TIDES

DIURNAL TIDES - ONE HIGH AND ONE LOW TIDE PER TIDAL DAY

SEMIDIURNAL TIDES - TWO HIGH AND TWO LOW TIDES OF SAME MAGNITUDES
EACH TIDAL DAY

MIXED TIDES - TWO HIGH AND TWO LOW TIDES OF DIFFERENT MAGNITUDES
PER TIDAL DAY

SPRING TIDES - TIMES OF HIGHEST AND LOWEST TIDES (EARTH, SUN, AND
MOON IN A STRAIGHT LINE)
*NEW AND FULL MOONS

NEAP TIDES - TIME OF LOW HIGH TIDES AND HIGH LOW TIDES (SUN AND
MOON AT RIGHT ANGLES TO THE EARTH)
*FIRST AND THIRD QUARTER MOONS

APOGEE - TIME WHEN THE MOON IS AT ITS GREATEST POINT FROM EARTH
(LOWEST TIDES)

PERIGEE - TIME WHEN THE MOON IS AT ITS CLOSEST POINT TO THE EARTH
(HIGHEST TIDES)
*THE VARIATION BETWEEN APOGEE
AND PERIGEE IS ABOUT 30,000 MILES

APHELION - TIME WHEN THE SUN IS AT ITS GREATEST POINT FROM THE
EARTH (LOWER TIDES) JULY FOURTH

PERIHELION - TIME WHEN SUN IS CLOSEST TO THE EARTH (HIGHER TIDES)
JANUARY THIRD
*VARIATION IS ABOUT 3,500,000 MILES