

## Spatial Databases and GIS

### Solutions for Sheet 10

#### Exercise 1 (Electromagnetic Spectrum)

1. What phenomenon is a hint for the fact, that the atmosphere influences blue light more than the other wavelengths of the visible spectrum? From which observations may you conclude that green light is less influenced by the atmosphere than blue but more than red?



*We see the sky blue, because the blue light is scattered more by the atmosphere than the other wavelength (it reaches the eye from everywhere). During sunrise and sunset the distance the light has to pass through the atmosphere is longer, most of the blue and green light are scattered away. That's why the sun and the surrounding clouds look red and/or yellow.*

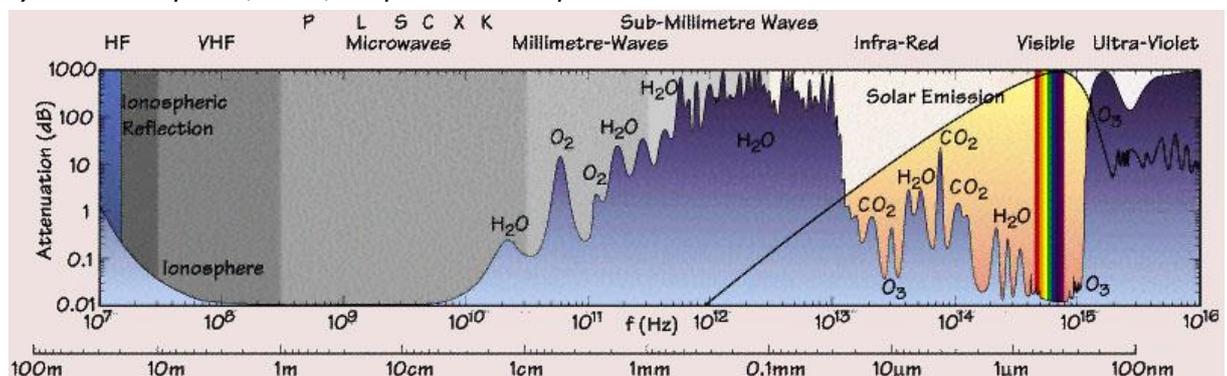


2. Why are usually wavelengths between 8-14  $\mu\text{m}$  used from the far infrared spectrum, although it covers a much bigger range of wavelengths (3-1000  $\mu\text{m}$ ) ?

*Because they are less influenced by the atmosphere, especially by water.*

3. Which wavelengths are suitable for passive satellite systems? Why?

*All wavelengths coming from the sun and being reflected by the earth and those that are directly emitted by the earth, strong enough to sense, and not much influenced by the atmosphere, i.e. 0,4-3  $\mu\text{m}$  and 8-14  $\mu\text{m}$*



## Exercise 2 (Orbits)

1. What influence on the observable area does the inclination have?

*Inclination around 90°: all of the earth surface may be observed.*

*Inclination of 0° the satellite stays above one latitude (usually equator), only a stripe of the earth surface may be observed.*

2. Why do earth observation satellites normally have a sun synchronous orbit?

*Orbit ascends or descends over any given point of the Earth's surface at the same local mean solar time → surface illumination angle will be nearly the same every time → better comparability*