

**2. Quiz (Oct. 6, 2005)**

(multiple correct answers are possible!)

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(name)

Fall 2005 *Global Biogeochemical Cycles Class*

Covering: Atmosphere & Soils

1. Horizontal transport in the Troposphere moves air once around the planet on a time scale of

- months
- weeks
- years
- days

*This is the transport time around the globe on either the NH or SH.*

2. To impact stratospheric ozone, it takes anthropogenically emitted chlorofluorocarbons

- 1 day
- 1 month
- 1 week
- >1 year

from/after ground release.

*Important here was that it takes more than a year to enter the Stratosphere through the Tropopause. Distribution up to the Tropopause takes just a month or so.*

3. A trace gas that is emitted in higher amounts in the Northern Hemisphere than the Southern Hemisphere will not show a gradient across the ITCZ if its chemical lifetime is

- >1 year
- < 1 year
- > ~100 years
- It will exhibit a gradient at any chemical lifetime.

*Even methane at 10 years lifetime shows a slight gradient. Only a very long-lived trace gas will show no gradient at all.*

4. True or false: Ozone is the main cleansing agent of the atmosphere with which most pollutants react chemically.

- TRUE
- FALSE

*OH is ! See next question:*

5. A radical with the formula  $\cdot\text{OH}$  is formed from ozone photolysis and subsequent reaction of the photolysis product with water vapor. Hence the production rate of that radical ...

- increases with height in the Troposphere
- decreases with height in the Troposphere
- none of the above

*The decreasing water vapor mixing ratio with height is the limit ...*

6. True or false: The chemistry of the atmosphere is driven by the incoming solar ultraviolet and visible radiation.

- TRUE
- FALSE

*Mostly UV, but also some visible light drives the chemistry. Any chemistry without light is MUCH slower, and then mostly exists because light has been there at some point ...*

7. Soils are formed from rock “weathering”. If no vegetation is presents, rocks can still wear away from

- carbonation weathering
- wind blown dust
- water erosion
- organic acid weathering

*Organic acids are from plant litter decomposition ...*

8. Podzolization in soils is common in

- seasonally arid environments
- midlatitude broadleaf forests
- the tropics
- high latitude conifer forests

*Both these types have adequate precipitation and litter input for SOM and therefore organic acid production for podzolization weathering. In the tropics, decay is too fast to produce significant org. acids that could move downwards in the soil profile.*

9. Soil texture influences

- the soils water holding capacity
- soil mineral composition
- soil aeration
- the vegetation that grows on that soil

*... soil mineral composition is a result of the bed rock and weathering, as is texture.*

10. The amount of SOM in a soil has certain benefits for the life it sustains, such as

- improved soil aeration and water holding capacity
- improved nutrient supply to plants
- improved resistance to erosion
- suppression of weeds

*Weeds love a soil with high SOM too ... J*