

## Quiz - 2: History and Radiative Forcing

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Questions: 10

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### 1. Radiative absorption (Points: 10)

Who first measured the infrared absorption properties of atmospheric molecules?

- a. Guy Callendar
- b. John Tyndall
- c. Svante Arrhenius
- d. Horace de Saussure

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### 2. GCM Complexity (Points: 10)

At the time of the IPCC Third Assessment Report, typical GCMs included

- A. atmospheric chemistry
- B. interactive vegetation
- C. atmospheric aerosols
- D. clouds
- E. volcanic activity

- 1. C, D, E
- 2. A, C, E
- 3. A, B, D
- 4. B, C, D

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### 3. GCM projections (Points: 10)

By 2005, the global average temperature had warmed by an amount that was less than the range projected by Third Assessment Report GCMs

- True  False

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### 4. Complementary Models (Points: 10)

These types of climate models complement GCMs typically by using higher horizontal resolution in some locations.

- a. Earth system models of intermediate complexity
- b. Regional climate models
- c. Global stratospheric models
- d. Global stretched-grid models

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**5. Greenhouse effect** (Points: 10)

The greenhouse effect is created by

- a. infrared radiation absorbed and re-emitted by carbon dioxide
- b. solar radiation absorbed by the earth's surface
- c. infrared radiation absorbed and re-emitted by clouds
- d. solar radiation reflected to space by clouds

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**6. Radiative forcing** (Points: 10)

Radiative forcing is the change in radiative energy flux at the tropopause after changing atmospheric composition and

- a. allowing surface temperature to readjust to radiative-dynamic equilibrium
- b. keeping tropospheric and surface temperatures fixed
- c. allowing stratospheric temperatures to readjust to radiative equilibrium
- d. allowing polar ice caps to melt

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**7. Industrial aerosols** (Points: 10)

Aerosol concentrations from industrial processes appear especially

- 1. in the central Pacific.
- 2. over Alaska.
- 3. over the eastern United States.
- 4. over Antarctica.

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**8. Land-use change** (Points: 10)

Since 1750, one of the places experiencing substantial growth in croplands is the U.S. Midwest.

True  False

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**9. Anthropogenic versus natural radiative forcing** (Points: 10)

According to the AR4, it is \_\_\_\_\_ that the net human influence on radiative forcing since 1750 is at least 5 times the solar influence.

- a. virtually certain
- b. unlikely
- c. likely
- d. about as likely as not

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**10. Indicators of anthropogenic carbon dioxide** (Points: 10)

Which of the following indicate that humans are causing the observed increasing levels of atmospheric carbon dioxide?

- a. The ratio of Carbon-13 to Carbon-12 has been decreasing.
- b. Atmospheric oxygen is decreasing as carbon dioxide increases.
- c. The amount of atmospheric methane has leveled off.
- d. The Montreal protocol has stabilized its concentration in the atmosphere.

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