

Quiz - 5: Climate Models - Structure and Evaluation

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Questions: 10

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1. Parameterization (Points: 10)

Parameterization is the means by which climate models

- a. compute parallel climates.
- b. represent the effects of processes unresolved by their grid.
- c. adjust their parameters for climate simulation.
- d. implement the metric system.

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2. Model resolution (Points: 10)

Typical resolution of global models contributing to the AR4 is about 5 times finer than the resolution of global models contributing to the First Assessment Report.

- True False

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3. Model emitted radiation (Points: 10)

The recent generation of global climate models matches these features of observed infrared radiation emitted to space:

- A. Maximum values are near 30 N and 30 S
- B. Polar regions have the largest values
- C. Amounts decrease with latitude north of 60 N
- D. Values on the equator are lower than some surrounding latitudes.

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

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4. Errors in simulated surface air temperature (Points: 10)

Some of the most noticeable error in the average temperature produced by GCMs is the positive error (warm bias)

- a. over the Sahara Desert.
- b. off the west coast of Africa and South America.
- c. over the Indian Ocean
- d. over Europe.

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5. Upper tropospheric humidity (Points: 10)

In GCMs, water vapor provides the largest positive radiative feedback.

- True False

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6. Clouds in GCMs (Points: 10)

Clouds were generally included in global climate models assessed by which of these reports? (Multiple correct answers. Select all of them to get full credit.)

- a. Third Assessment Report
- b. Fourth Assessment Report
- c. Second Assessment Report
- d. First Assessment Report

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7. Fundamental Basis of Climate Models (Points: 10)

What are some of the fundamental laws of physics that form the basis of global climate models? (multiple correct answers, choose all of them for full credit)

- a. First Law of Thermodynamics
- b. Heisenberg's Uncertainty Principle
- c. Conservation of Mass
- d. Newton's Second Law
- e. Conservation of Static Electricity

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8. Normalized model errors (Points: 10)

Which of these three fields generally has the smallest normalized error in GCMs?

- a. Mean sea-level pressure
- b. Surface air temperature
- c. Precipitation

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9. Ocean temperature errors (Points: 10)

Errors in ocean temperatures among GCMs contributing to the AR4 are mostly

- a. more negative than - 2.5 degrees C.
- b. between -2 and +2 degrees C.
- c. greater than +10 degrees C.
- d. too small to measure.

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10. Atmospheric humidity (Points: 10)

Atmospheric humidity averaged over 20 contemporary GCMs shows a tropical moist bias that is largest at about

- 1. 700 millibars
- 2. 500 millibars
- 3. 300 millibars
- 4. 1000 millibars

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