

Possible Essay Questions for GHY 5015 Climate Change Final Exam

1. The North Carolina State Legislature has requested your expert opinion on the following questions: 1) causes of global warming (or global climate change), 2) a “timetable of expected effects or results in North Carolina and beyond,” and 3) “what North Carolina and our nation as a whole can do to prevent global warming or mitigate further effects of it.”
2. Francis and colleagues have hypothesized a link between a warming Arctic (decreasing summer/fall sea ice in particular) and more extreme weather in the middle latitudes due a more amplified upper-level flow. Evaluate this “Arctic Amplification” based on the available observational evidence.
3. Fully discuss the natural and anthropogenic forcings on our current climate, including the level of scientific understanding of each. Which forcing is most significant in the context of the current climate and why?
4. Discuss the similarities and differences in the model projections for the different Representative Concentration Pathways (RCPs) to evaluate future climate change impacts.
5. Elaborate on the observational and modeling evidence linking global climate change and extreme weather, including tropical cyclones. Have extreme weather events become more frequent? If so, which ones and why? Are extreme weather events projected to become more common in a warming climate? If so, which ones and why?
6. Completely evaluate the scientific veracity of The Great Global Warming Swindle. What are the factual arguments? Fallacies? Are the people interviewed credible?
7. The IPCC AR4 Physical Science Basis (Trenberth et al. 2007) states that following: “Decadal variations in teleconnections considerably complicate the interpretation of climate change. Since the TAR, it has become clear that a small number of teleconnection patterns account for much of the seasonal to interannual variability in the extratropics.” Please discuss the major teleconnection patterns that account for much of the seasonal to interannual variability in the extratropics. How has atmospheric circulation (and associated teleconnection patterns) changed since 1980 and how has this complicated the interpretation of climate change?
8. Fully discuss the hypothesized influences on northern hemisphere winter atmospheric circulation. From your perspective, which is/are most plausible?
9. Fully discuss observed changes in the cryosphere since 1950.
10. What is the “Uncertainty Monster” what role does it play in the current scientific and policy debate with respect to global climate change? From your perspective, how can scientific uncertainty be better quantified and communicated? Do you agree with Curry and Webster’s (2013) main arguments? Why or why not?