11A.4 **Measures To Improve Our Understanding of Weather and Climate Extremes**

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In this paper we identify areas of research and activities that can improve our understanding of weather and climate extremes. These suggestions are drawn directly from Chapter 4 of the Climate Change Science Program Synthesis and Assessment Product 3.3: Weather and Climate Extremes in a Changing Climate. The following measures would be beneficial steps to improve our understanding:

1. Continued development and maintenance of high quality climate observing systems will improve our ability to monitor and detect future changes in climate extremes.

2. Efforts to digitize, homogenize and analyze long-term observations in the instrumental record with multiple independent experts and analysis improve our confidence in detecting past changes in climate extremes.

3. Weather observing systems adhering to standards of observation consistent with the needs of both the climate and weather communities improves our ability to detect observed changes in climate extremes.

4. Extended reconstructions of past climate using weather models initialized with homogeneous surface observations would help improve our understanding of strong extratropical cyclones.

5. The creation of annually-resolved, regional-scale reconstructions of the climate for the past 2,000 years would help improve our understanding of very-long-term regional climate variability.

6. Improvements in our understanding of the mechanisms that govern hurricane intensity would lead to better short- and long-term predictive capabilities.

7. Establishing a globally-consistent wind definition for determining hurricane intensity would allow for more consistent comparisons across the globe.

8. Improvements in the ability of climate models to recreate the recent past as well as make projections under a variety of forcing scenarios are dependent on access to both computational and human resources.

9. More extensive access to high temporal resolution data (daily, hourly) from climate model simulations both of the past and for the future would allow for improved understanding of potential changes in weather and climate extremes.

10. Research should focus on the development of a better understanding of the physical processes that produce extremes and how these processes change with climate.

11. Enhanced communication between the climate science community and those who make climate-sensitive decisions would strengthen our understanding of climate extremes and their impacts.

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REFERENCES

To reference the chapter mentioned, please visit: http://www.climatescience.gov/Library/sap/sap3-3/final-report/default.htm