

# **Breakout Working Groups**

Day 1.....Tuesday 17 August

## *Overarching Question I*

***What are the science requirements and capabilities for near-realtime attribution?***

**a) Drought**

*How well is "drought" monitored? (e.g., in situ/remote methods).*

*How well are the causes for drought understood? (e.g., historical events, midlatitude droughts, monsoon failures, influence of warming trends on evaporative loss)*

*How do we relate meteorological causes for drought to the societal/sectoral impacts of drought?*

*What challenges distinguish science requirements for attribution (and prediction) of short vs long-term drought? (e.g., "flash" droughts vs mega-droughts)*

**b) Extreme Climate-related events**

*What is "extreme"? (e.g., extreme meteorological conditions vs extreme impacts)*

*What is the spatial and temporal context of "extremes"?*

*How well are the observed statistics of extreme meteorological conditions known?*

*How are extremes in climate linked with extreme weather?*

*What are the modeling requirements for addressing extreme climate-related events (e.g, temperature, vs pcpn; phenomena such as tropical storms, heat waves, etc).*

### ***c) Climate trends***

*How to distinguish near-time natural decadal variations from anthropogenically forced trends?*

*At what spatial scales can trend assessment currently be performed (e.g., temperature, vs pcpn).*

*How well are potential forcing mechanisms of climate trends understood and monitored?*

*Physical trends versus data/analysis inhomogenitiies.*

### ***Key cross-cutting issues to discuss***

*What conditions, from a science capability perspective, should we be attempting to attribute?*

*What is the quality of observations?*

*What is the value and availability of historical records, including paleo data?*

*What is the suitability of models to test cause-effect linkages?*

*Is the current portfolio of coupled model simulations (e.g., CMIP3 or CMIP5) adequate for attribution?*

*What types of modeling capabilities and experimentation are needed for near-realtime attribution?*

*Are additional sets of forced coupled model simulations needed that would be routinely maintained (rather than every 7 yrs as per the IPCC cycle)?*

*Best practices for attribution (probabilistic, fraction of attributable risk, etc)*

*Reactive vs proactive attribution*

*Reducing the lag time between event occurrence and scientific assessment*

*Is there enough (and reliable) information from the climate change projection simulations to proactively quantify changes in probabilities for future droughts and extreme events?*

*How to validate and calibrate near-realtime attribution products.*

## Day 2.....Wednesday 18 August

### *Overarching Question II*

#### ***Who Needs Climate Attribution and How Can Attribution Information be Communicated?***

**a) Drought**

*What are the specific needs for drought attribution (e.g., to support NIDIS, USAID/FEWS, adaptation)?*

*Attribution of drought versus attribution of drought impacts.*

*Who/what entity would present drought assessments to users?*

**b) Extreme Climate-related events**

*What types of extreme events are of greatest policy/societal relevance?*

*How to communicate probabilistic attribution? (e.g, fraction of attributable risk).*

*Given infrastructure that is required for attribution, what is a practical lag time between event occurrence vs the assessment report from a user perspective?*

**c) Climate trend**

*Trends of which physical properties are of greatest concern/interest?*

*Trends over what period of time are of greatest practical interest?*

*Which users are most concerned about long term (multi-decadal) trends?*

*How might trend assessments inform user-based scenario processes for discerning future conditions?*

*What are meaningful reference periods (e.g., prior century, prior 30-yrs, prior decade)?*

### ***Key cross-cutting issues to discuss***

*What, from a user perspective, should we be attempting to attribute?*

*What are user requirements for reliability, robustness, and trust-worthiness of near-realtime attribution products?*

*Who would be points of contact for attribution products, and how would the products be distributed?*

*How do we communicate the uncertainty in attribution results?*

*What reviewing process should be followed for attribution-related assessments?*

*Multi-media approaches to explaining causes for climate conditions Opportunistic vs comprehensive approaches to attribution*

*Regular, scheduled attribution products ("operational")*

*Rapid (or preliminary) response versus authoritative response*