

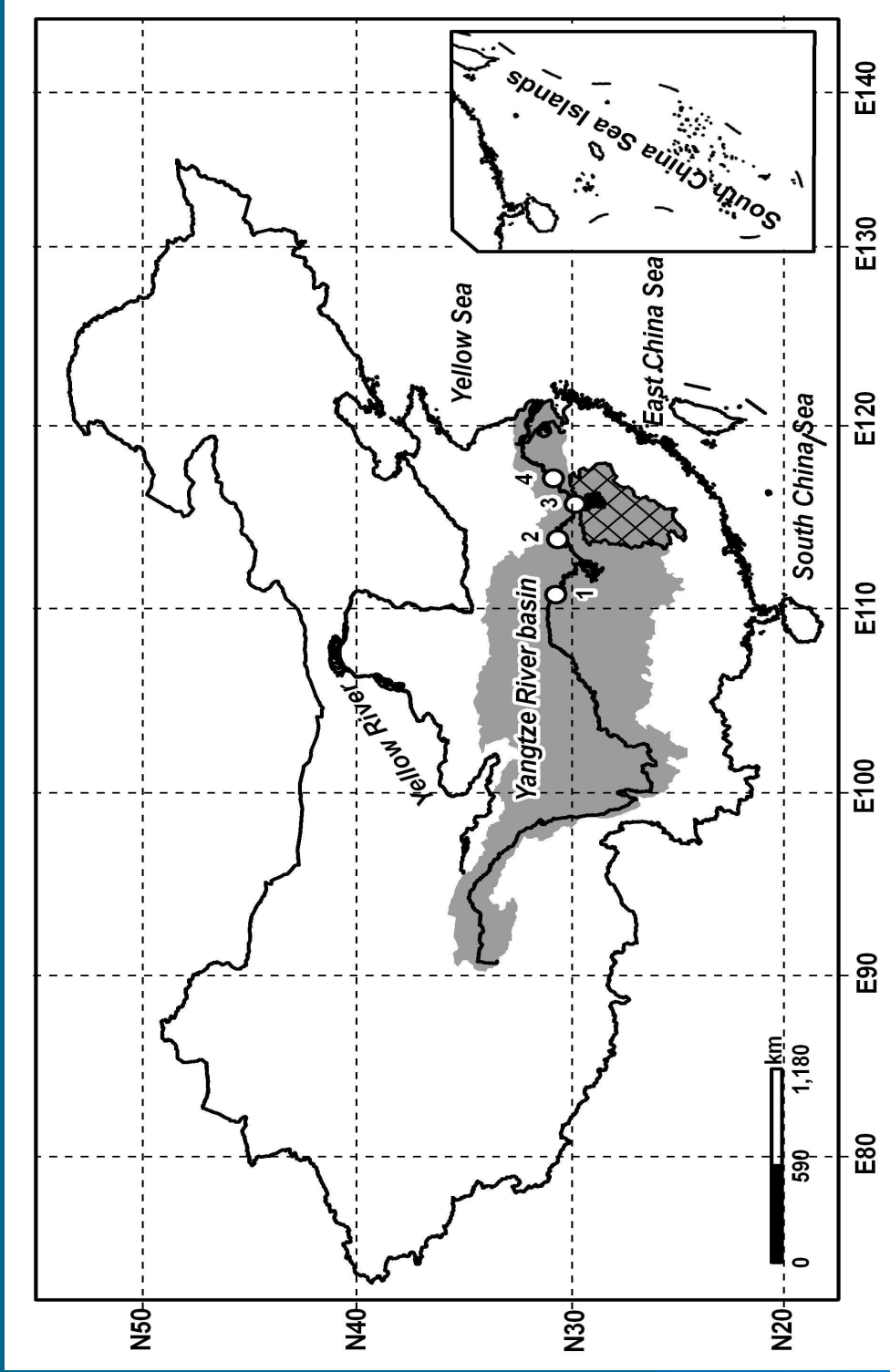
Current Situation about Use of Climate Information in Flood Management in the Yangtze River Basin, China

Qi S. Hu¹, Hua Guo^{1,2}, and Tong Jiang²


1: School of Natural Resources, and Department of
Geosciences

University of Nebraska-Lincoln
Lincoln, NE 68583-0987

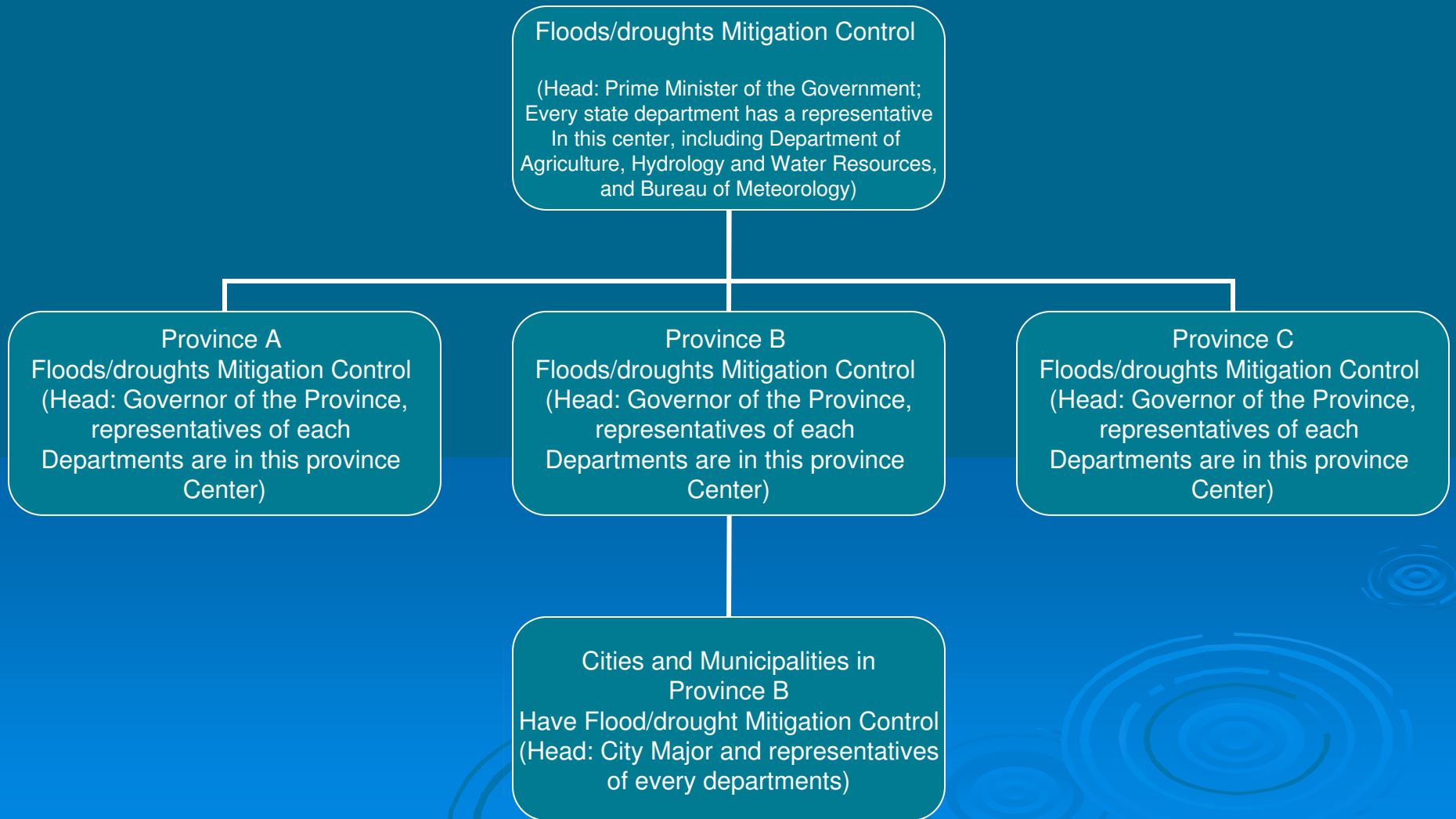
2: Nanjing Institute of Geography and Limnology,
Chinese Academy of Sciences
Nanjing, 200018 China



A flood prone region

- Since 1990, five major floods occurred in the summers of 1991, 1995, 1996, 1998 and 1999. Among them the 1998 flood set many records in flood history for the basin.
 - Damages worth of billions of dollars were done to both the infrastructures and properties of the societies.
- 

Infrastructure of Flood Control in China



Flood Management in the Yangtze River Basin

Yangtze River Flood Mitigation Control (Wuhan, China)
It has representatives from
Flood Mitigation Offices in the provinces that
are affected by Yangtze River floods

It does not have any jurisdiction
power of using any resources
in flood control

The role of this office is to manage the
hydrological stations along major streams in the river basin
and issue predictions of water level and flux at major sections
(cities) along the Yangtze River.

It uses various models to make
Predictions of flood stages for major
Cities and regions along the river.
There is little weather and climate predictions used.

It sends the predictions to the
National Flood/drought Mitigation
Control where the predictions are sent
to province offices (of all river basins)

How much weather and climate predictions
are used in this flood prediction and
management system?

Nearly none!



Why?

- 1) Predictions of stream and river flows rely on actual rainfall in the river basin or its tributaries, and need no future predictions of rainfall.
- 2) Predictions of stream and river flows require high resolution observations of rainfall in the basins and such observations are not provided by meteorological services.

Flood predictions are made

using over 10 thousands of local rainfall observations collected by individuals managed by local or district hydrological offices across the river basin. These observers only report when there is rainfall at his/her gauge.

These rainfall observations are used in numerical models to calculate surface flows and flood stages and risks across the Yangtze River basin.

These observers do not communicate with the local or regional meteorological offices, and their observations are not accepted by meteorological offices.



The flood predictions are sent up and then down and eventually to all the Flood Mitigation Control Offices in the provinces affected by the River.

These Offices also make their own predictions of flood stages and risks at sub-basins affecting their jurisdictions.

(Again in this process regional offices will use their own rainfall observers.)

When are the Weather and Climate Forecasts used in Flood Mitigation?

- They are used in predictions of the future flood stages during a flood event.
- Predictions of next few days rainfall potential and amounts are made at a forecast office in the Chinese Meteorological Administration and issued to major flood control offices and used in river stage and flood risk/magnitude predictions.

Existing problems

- Observation: Meteorological observation networks are too coarse to be useful for producing data sets with sufficient spatial resolution for hydrology models used in flood prediction for various basins.
- More seriously, there is little exchange of data between meteorology and hydrology camps. They are protecting their data and don't want to share with the other camp (although the situation is improving).

Existing problems (continued)

- Predictions: Weather predictions are inaccurate (or “fuzzy” in some hydrologists’ word) in both spatial coverage and amount, which are critical for river stage and flood predictions. For example, a forecast saying “there will be intense rainfall in the southern part of the Yangtze River” provides nothing for a hydrologist who needs to know exact how much rain will be in a particular basin in order to calculate river flow and flood stage.

Needed improvements

- Improve communications and allow data sharing between the hydrology and meteorology organizations.
- Increase the spatial resolution of (both meteorological and hydrological) observations, perhaps by increasing use of satellite technology, to improve predictions of both rainfall and surface flows.
- Improved rainfall predictions may increase their use in flood control and mitigation.

Any suggestions?

