

Development and Application of Global Drainage Basin Database (GDBD)

12th. AIM International Workshop

February 19th-21st, 2007

National Institute for Environmental Studies, Japan

Yuji Masutomi

Assistant Fellow

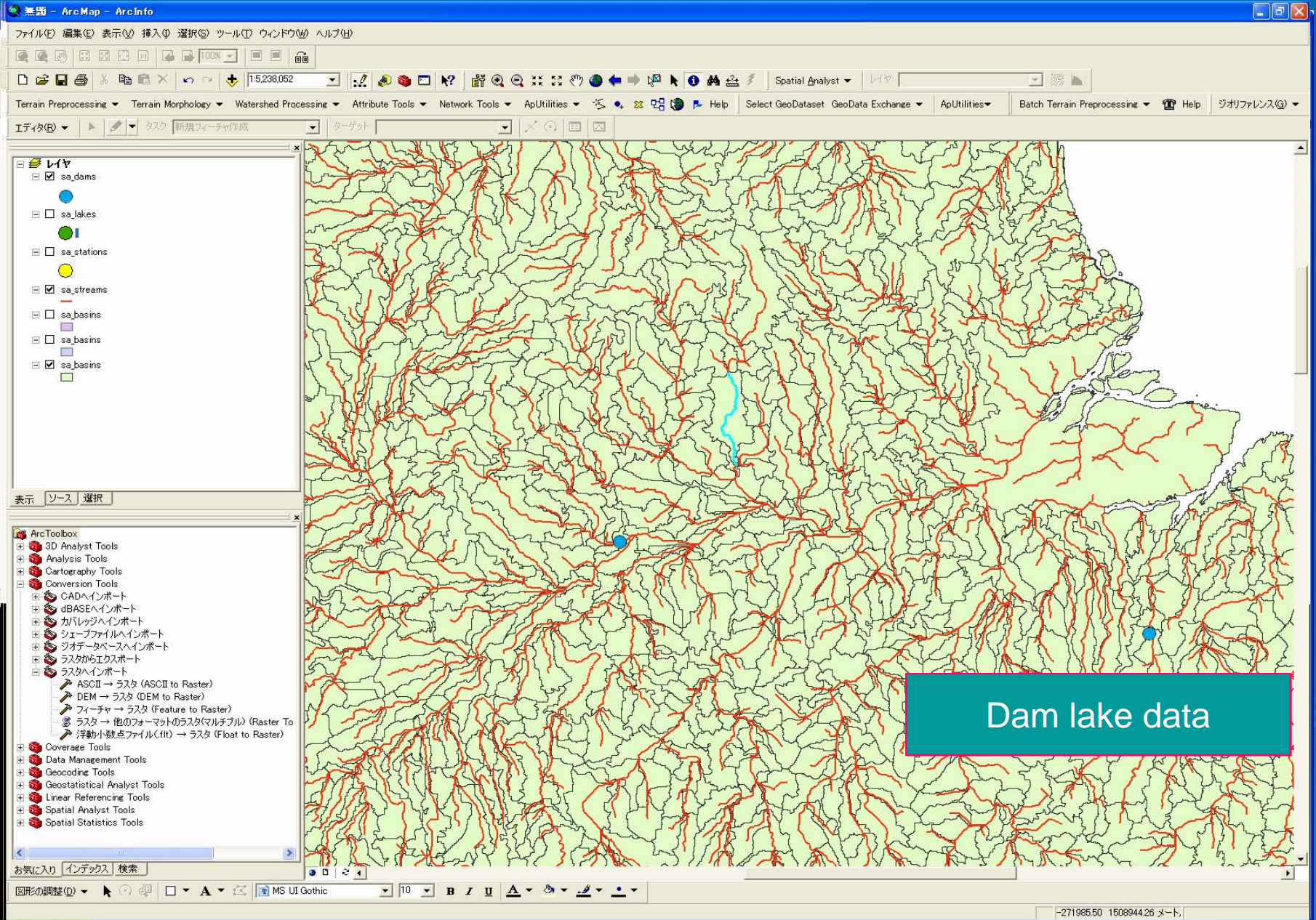
National Institute for Environmental Studies

Motivation and Overview of GDBD

- In the 21st century, human well-being will be locally and globally affected by various water-related issues.
 - freshwater scarcity and pollution, floods, disturbance of biogeochemical cycles, conflicts in international river basins and so on....
- For understanding and addressing these issues, baseline data is prerequisite.



- So we have developed **Global Drainage Basin Database (GDBD)**.
 - Consists of 6 GIS data
 - Basin boundary data
 - Stream network data
 - Discharge station data
 - Natural lake data
 - Dam lake data
 - Flow direction data
 - Gives us
 - hydrological flows of land surface
 - appropriate spatial unit
 - for **analysis, assessment and management**
 - Geographic, topographic, and social information



Dam lake data

Shape_Length 666000.102545
Shape_Area 7718000285.6013

Circumference, Area of information

-271985.50 1508944.26 メートル

Features of GDBD ①

-Data format-

➤ ArcGIS Geodatabase format

- ArcGIS + MS Access
 - Suitable for development of database based on GIS data
 - We can browse and edit database
 - Not only by ArcGIS but also by MS Access
 - Useful for those not familiar with GIS

Microsoft Access - [as_basins : テーブル]

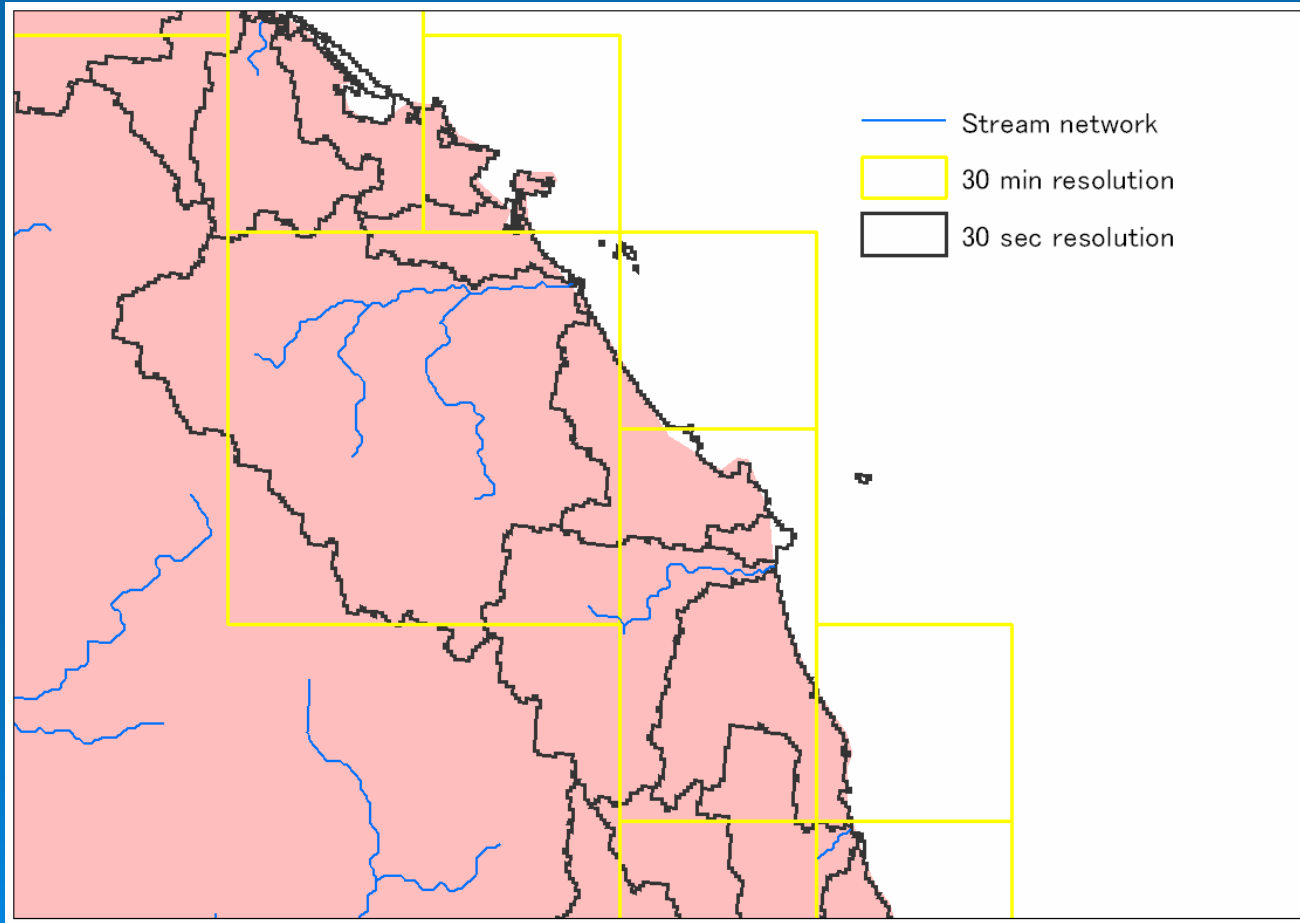
ファイル(F) 編集(E) 表示(V) 挿入(I) 書式(O) レコード(R) ツール(T) ウィンドウ(W) ヘルプ(H) Adobe PDF(P)

Region_NO	SubRegion_NO	Basin_NO	Pfa_Code	Dwn_Pfa_Code	Accum_Area	Ave_Elev	Ave_Slp	Str_Lngth	Ave_Str_Slp	Cntry_1	
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2	2	2	13	44300000	44100000	6219999230.67	63.58847	1.314895	93254.88	0.2711592	Russia

Features of GDBD ②

-Data resolution-

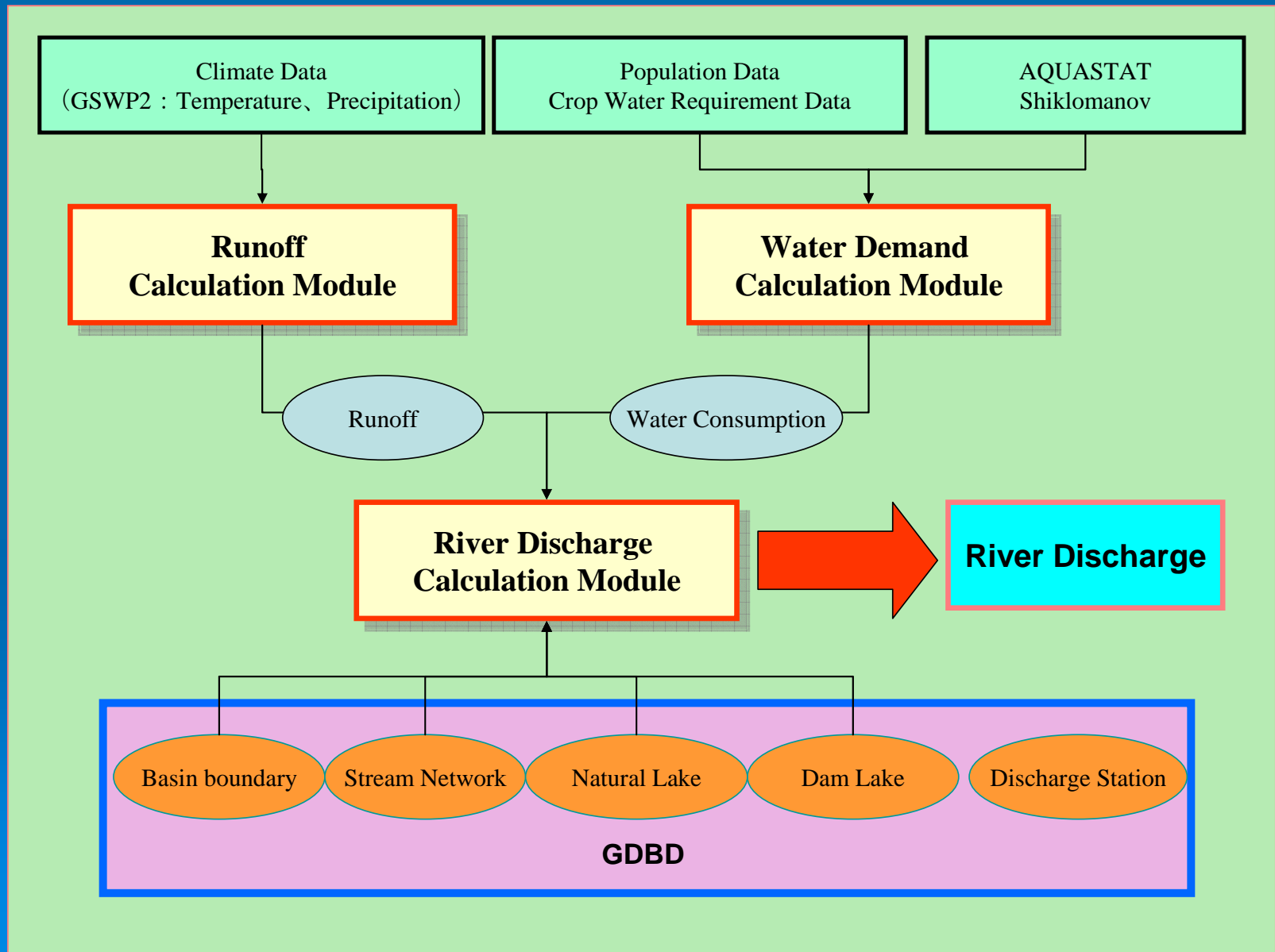
- High-resolution data (30 seconds \doteq 1km)



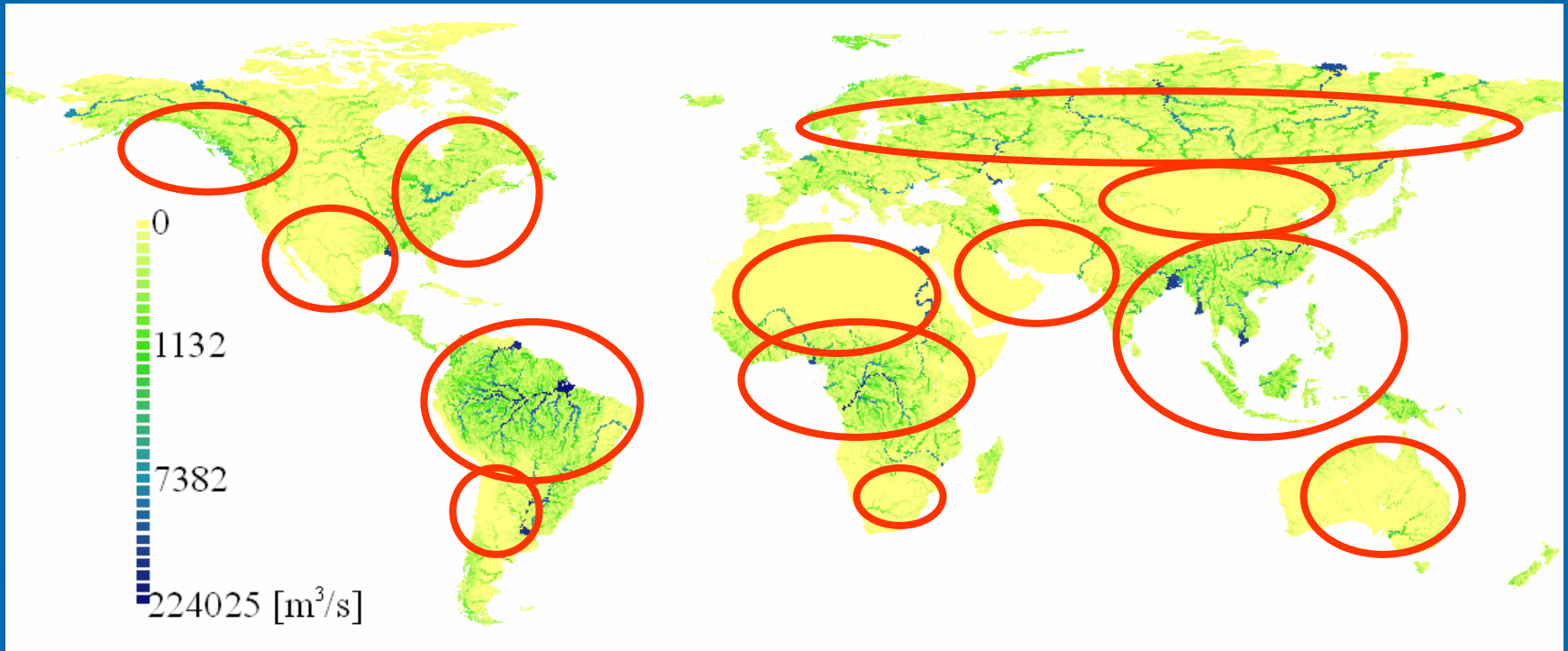
Comparison between 30 min and 30 sec basin boundary

Application of GDBD

-Development of Water Supply/Demand Calculation Model-



Result -Global-

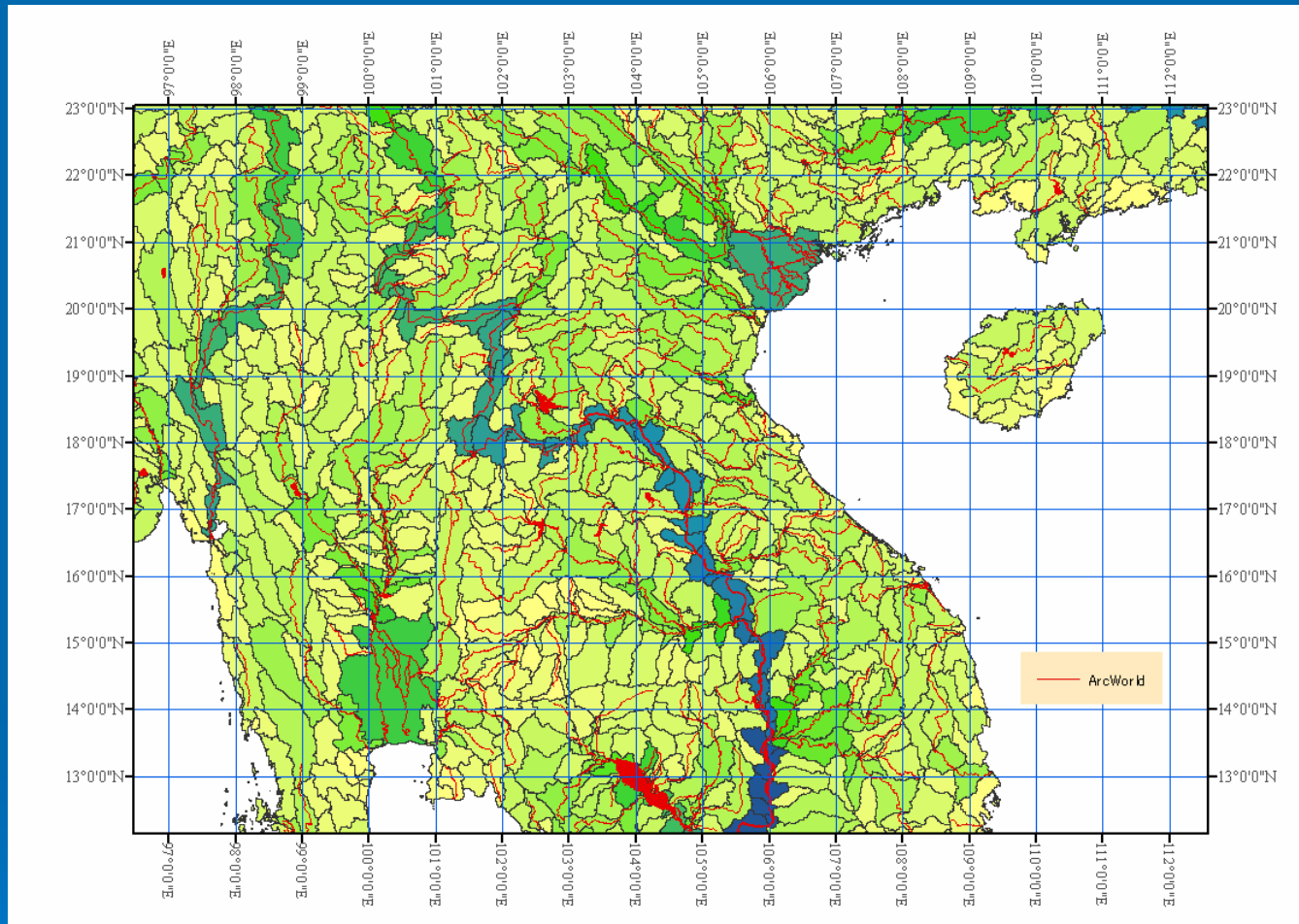


Annual river discharge [m^3/s]

- Abundant in **hi-latitude** and **equatorial** region
- Scarce in **mid-latitude** region

There is spatial variability of water resource

Result -Regional-

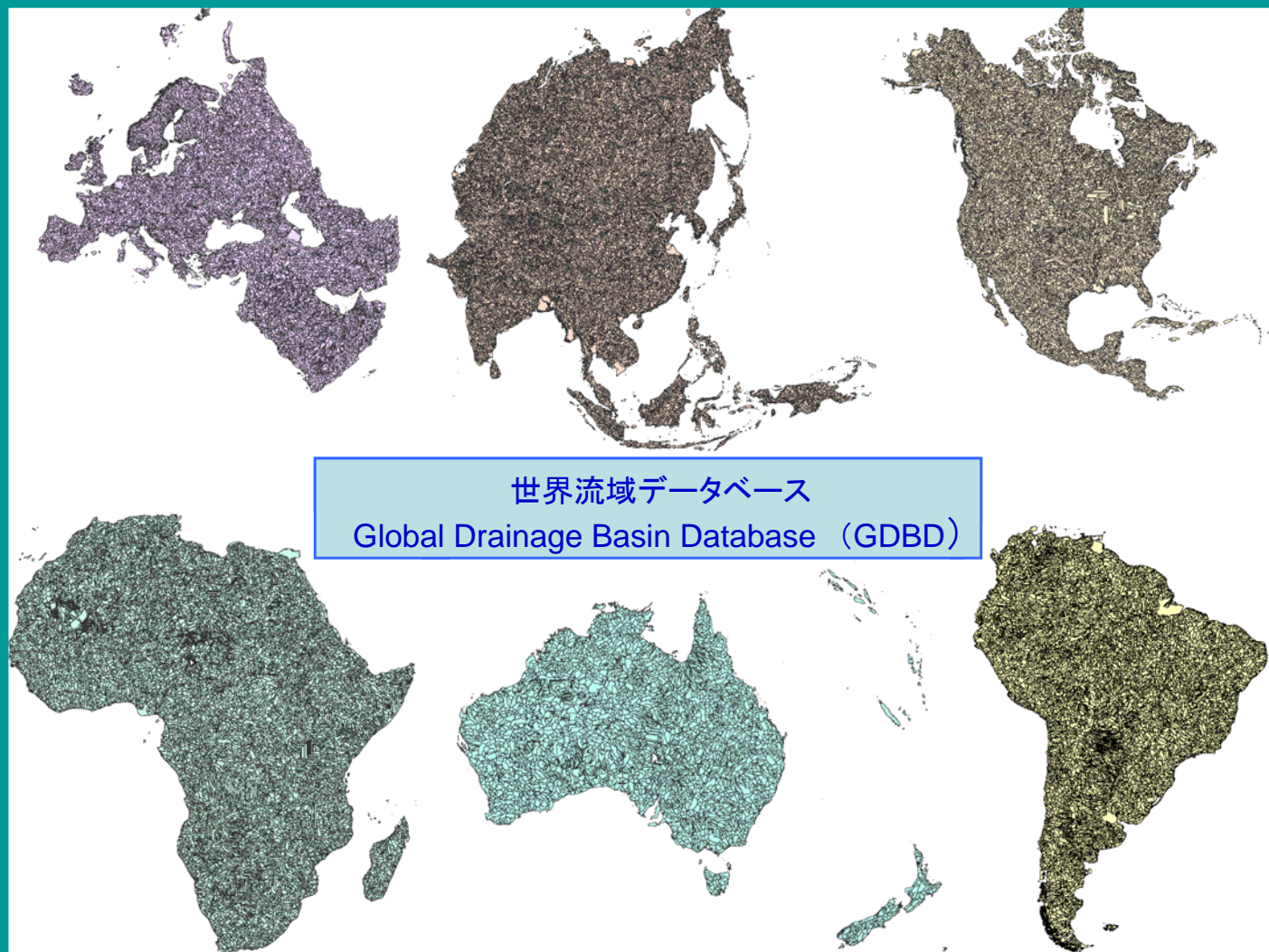


Annual river discharge [m³/s] (Indochina Peninsula)

- We can see spatial variability of water resource **at small scale** by using **high-resolution basin boundary data of GDBD**

Summary and future plans

- We have developed Global Drainage Basin Database (GDBD)
 - Basin boundary, Stream network, River discharge station, Natural lake, Dam lake, Flow direction
 - a broad range of information
- We have developed water supply/demand calculation model based on GDBD.
 - We can see spatial variability of water resource by this model
- We will apply GDBD and the model based on GDBD to not only global but also regional water-related problem.



Available soon from

<http://www-cger.nies.go.jp/cger-j/db/dbhome.html>

Thank you for your attention

