The CAS Cyber infrastructure and e-Science in Past & Near Coming

YAN Baoping (ybp@cnic.cn)

Expert Committee for Informatization of CAS

Computer Network Information Center , CAS

WeiZhou (weizhou@cnic.cn)

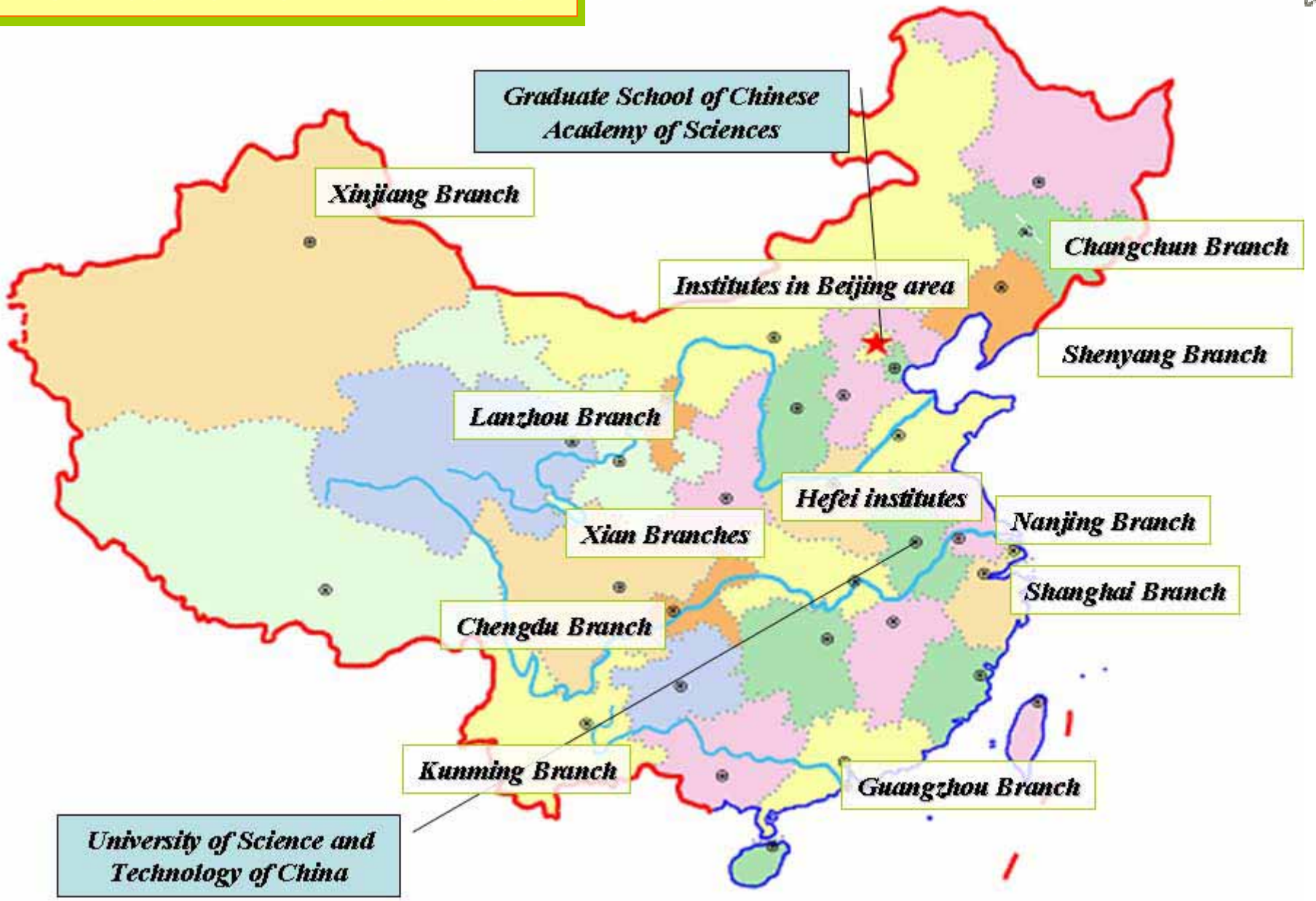
Grid@Asia & GFK 2006

Agenda

- CAS Overview
- CAS Cyberinfrastructure in 2001-2005
- CAS e-Science in 2006-2010
  - Why e-Science in CAS
  - What Component of e-Science in CAS
  - When e-Science of CAS
  - How e-Science in CAS
- Some typical Field Applications
- Conclusion

Chinese Academy of Sciences (CAS)

Distribution of Institutes



+200 Wild Field Observatories Distributed

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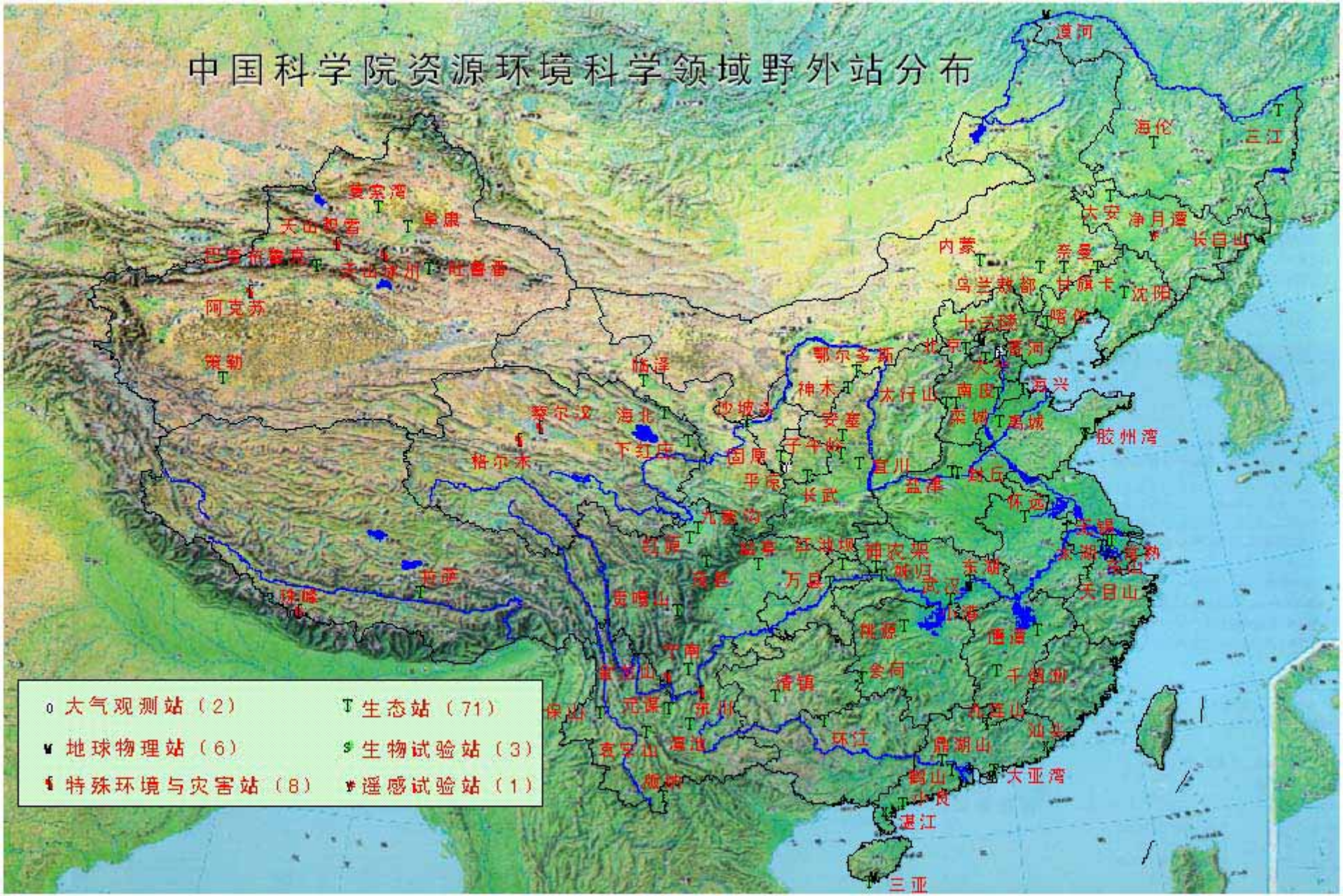

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Some Priorities in Basic Research

Priorities in Life Sciences & Biotech

Priorities in Resources and Environment

Priorities in High-tech R&D

Key Innovation Projects for Social Benefits

New Drug Development

Oil and Gas Exploration Theory and Technology Application

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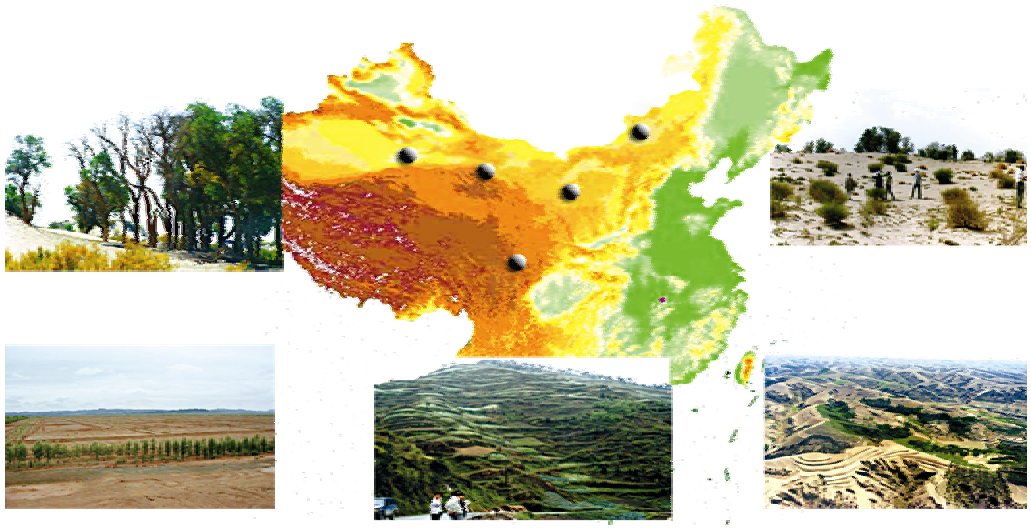
Eco-environmental Study in Western China



Experimental Demonstration of Eco-environmental Construction

Key Innovation Projects for Social Benefits

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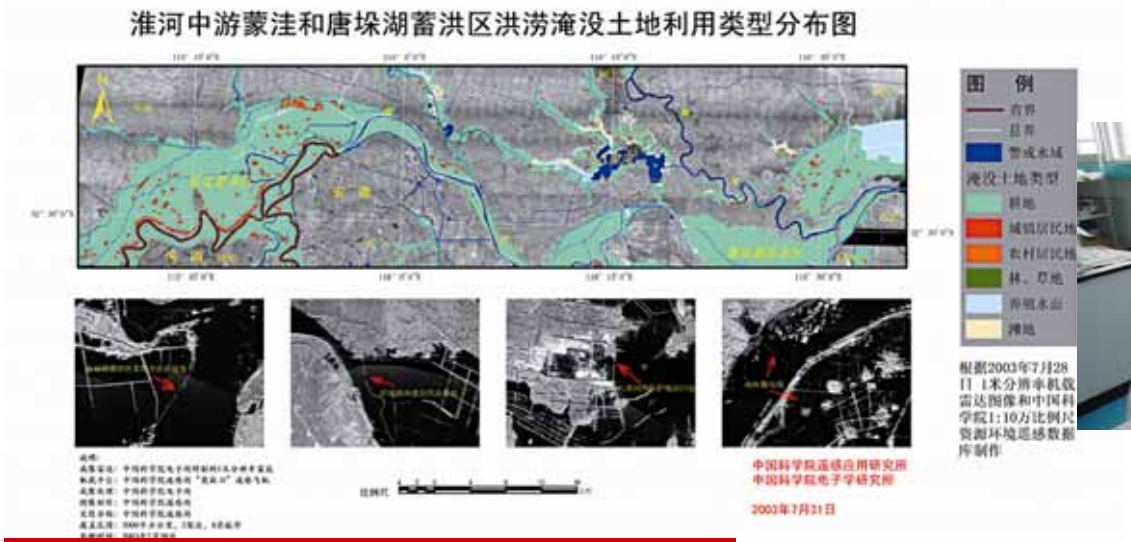
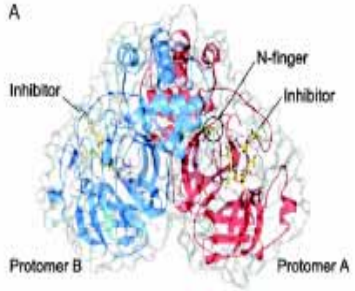
Computer Network Information Center, Chinese Academy of Sciences



Remote Monitoring of Resources, Disasters, and Environmental Change



SARS Research and Prevention

Stability Technology and Pilot Demonstration of Frozen Railway Base in Qinghai-Tibetan Railway Construction

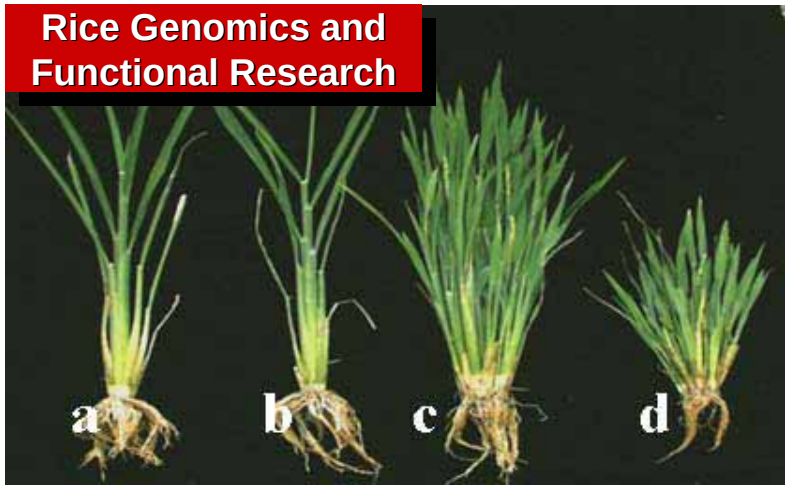
Breeding and Cultivation Technique of Major Agro-crops

Key Original Scientific Innovation

Sequencing of Functional Rice Genomics

1% Genomic Sequencing of Human Genome Program

Rice Genomics and Functional Research



Big Progress in Bio-evolution Research

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CAS' e-Science Activities

Why e-Science in CAS

Challenges in modern sciences research faced by CAS:

- Science problems are more complex than ever
- Science research object is not isolated, but cross-discipline and large-scale
- Science data processing, simulation and computing become indispensable methods
- Scientific researchers need more and more communication, collaboration, coordination among them closer than ever……

Cosmic Ray Observatory On Tibet (before)

Scientific Investigation in wild field under e-Science environment

Some Elements of e-Science

- e-Science Environment: Cyber-infrastructure and Scientific Research Facility based on IT
- New Scientific Research model under e-Science
  : e-science work flow
- New Organization Model for Researching under e-Science: v-Lab
- New tech & software: system/middleware/application, grid, web service, CA, security….
- New Scientist : e-Scientist – IT- enable researchers
- Pilot e-Science Applications
- …..

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Informatization Program of CAS in 2001-2005

- 2001, CAS initiated the key Informatization Program in the 10th Five-year Plan (2001-2005)

- Total budget: 43.75 Millions US Dollars

- The goals of this program：
  - Upgrading the cyber-infrastructure, i.e. , CSTNet , super computing, mass storage, SDB, ….
  - Integrating content: CAS' Web, Virtual Science Museum……
  - Driving some science researches based IP
  - Developing new IT technologies, including grid, CNGI,….
  - Training IT-enable scientists and researchers…..

CAS' Informatization Program in 2001-2005

CAS Web Site

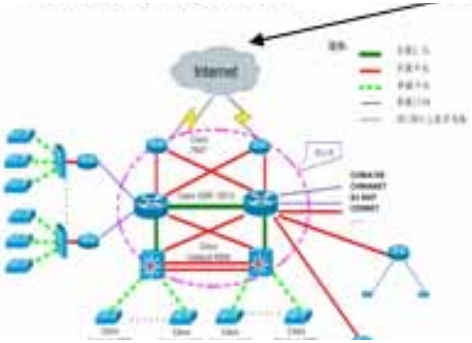
Video Conference System

ARP

Distance Education

industry system web site

virtual Science museums



networking

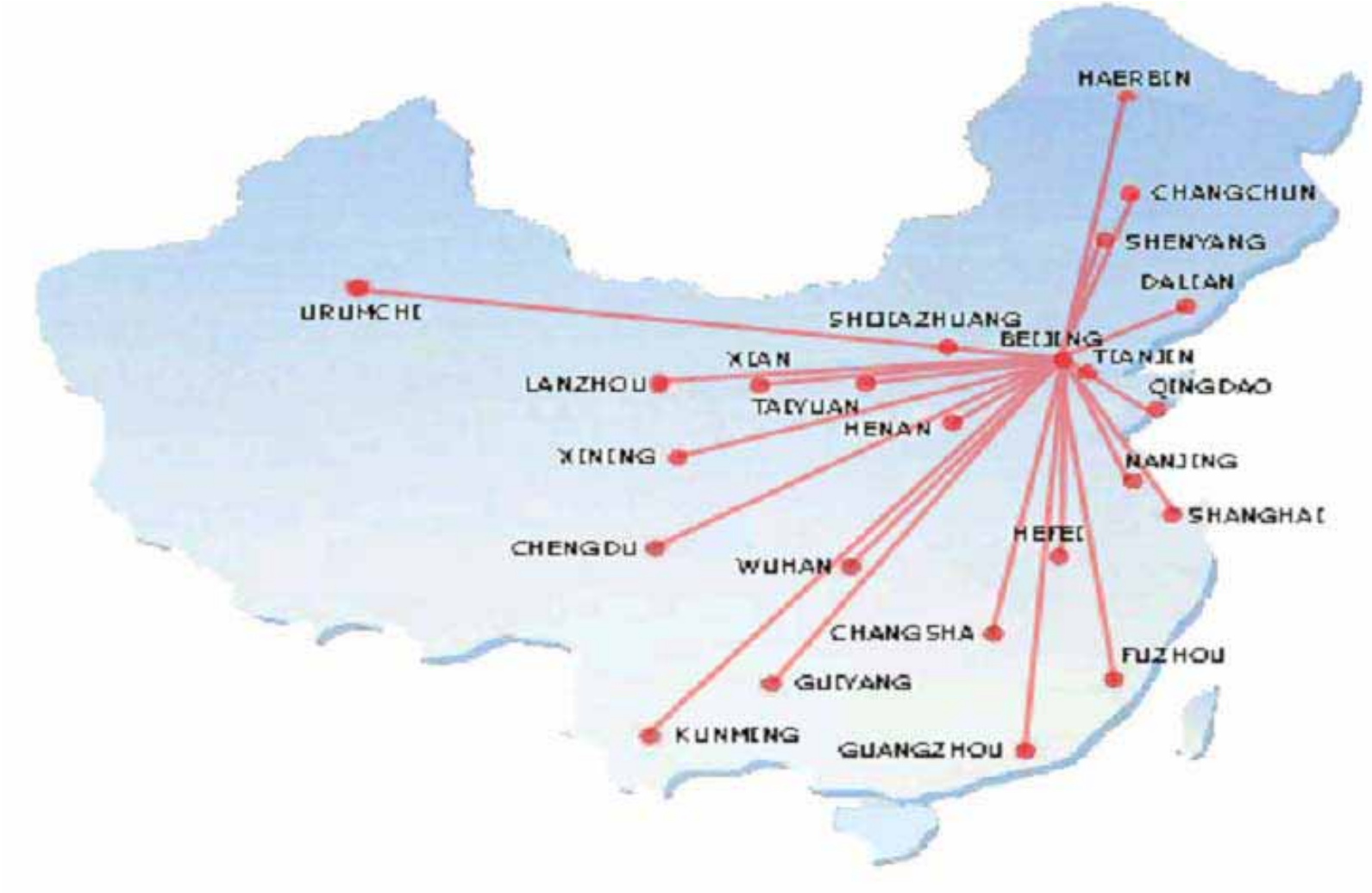
Scientific Database

Supercomputing

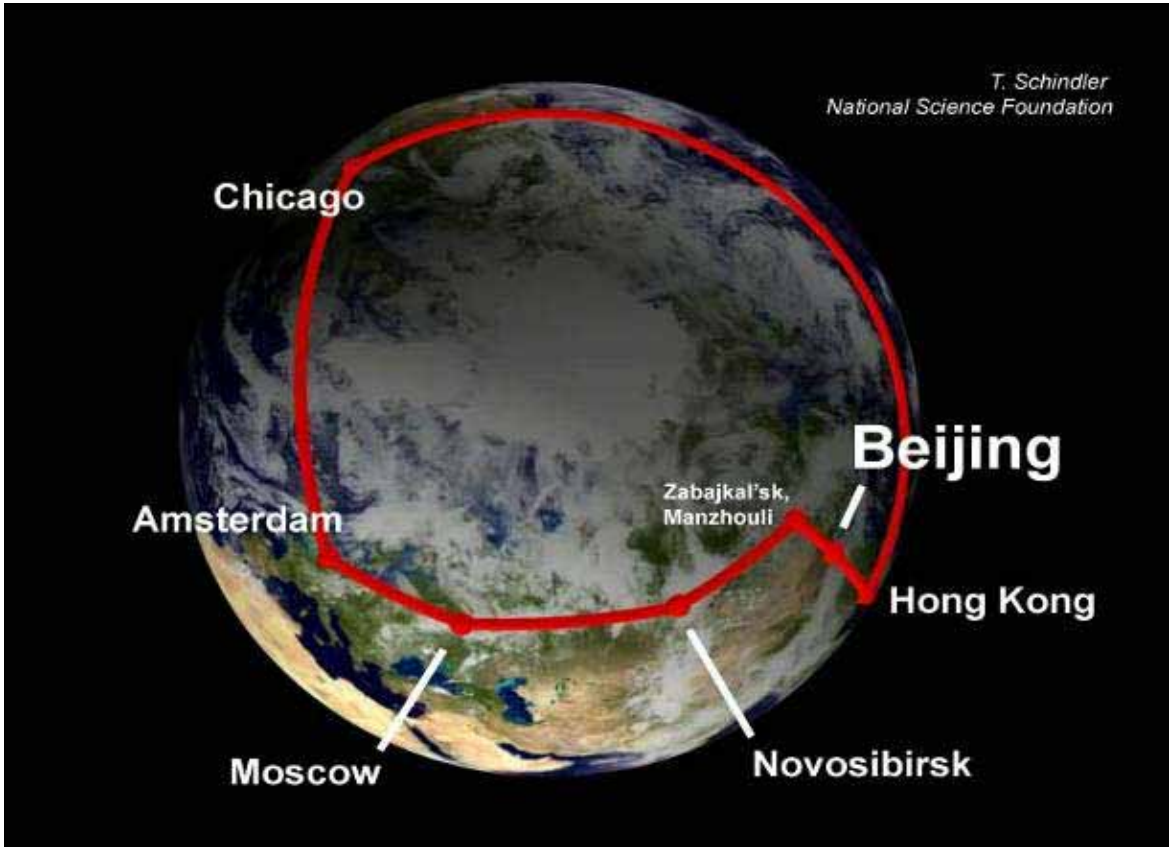
CAS Cyberinfrastructure Situation

Infrastructure	Item	By 2000	By 2005
Networking	core	1Gbps	**2.5Gbps**
	backbone	2Mbps	**N*155Mbps+5G**
	Oversea link	55Mbps	**620Mbps+17.5G**
HPC	Peak TFLOPS	0.13	**5.5Tf**
	Linpack TFLOPS	0.05	**4.3Tf**
	Storage	2.1TB	**180TB(Disk+Ta)**
Scientific Database	Member institutes	21	**45**
	Databases	180	**503**
	Data volume	725GB	**16.6TB**

Nodes of CSTNET



GLORIAD Birdy View



GLORIAD Grand Opening Ceremony, CAS Headquarter
Jan.12, 2004

Computing Facilities (cont.)

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- Lenovo DeepComp 6800

  Peak: 5.3TeraFLOPS
  HPL: 4.2 TeraFLOPS
  Rank in TOP500: 14 (2003)
  Number of nodes: 265 (59 nodes for SDB)
  Number of processors: 1060
  Processor: Itanium 2, 1.3 GHz
  Memory: 2.6 TBytes
  Storage: 80 TBytes
  Network: Quadrics QSnet
  OS: Red hat AS 2.1

  Installation : December, 2003

Predication of earthquake in Yangjiang, Guangdong

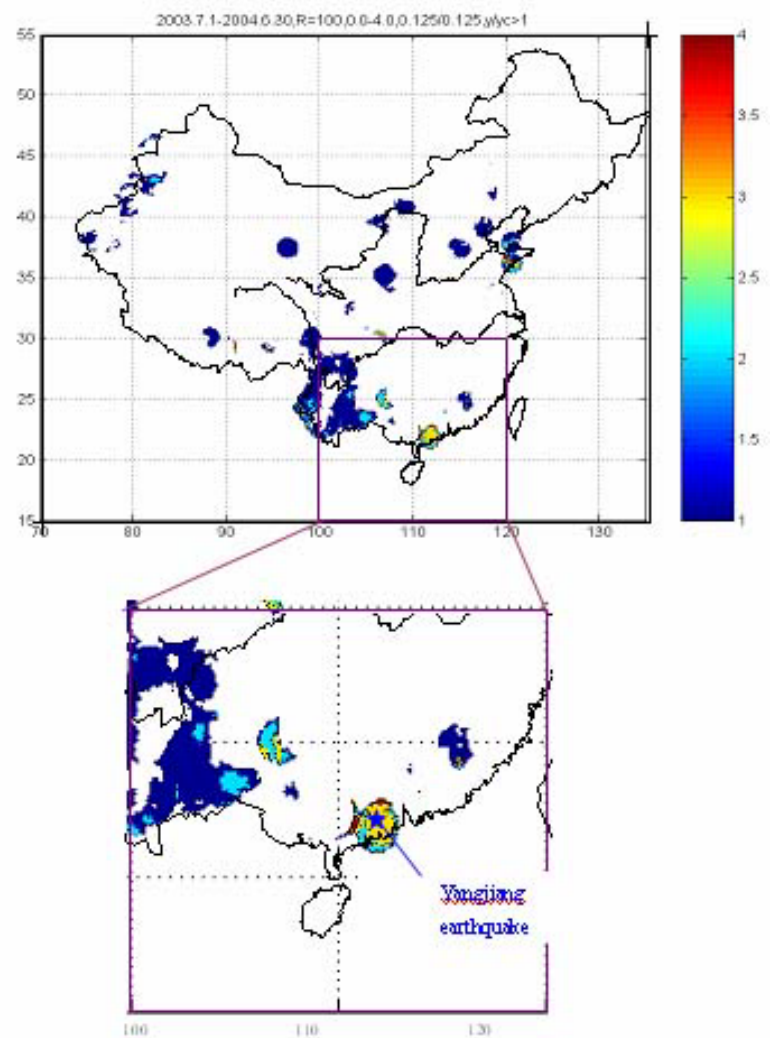
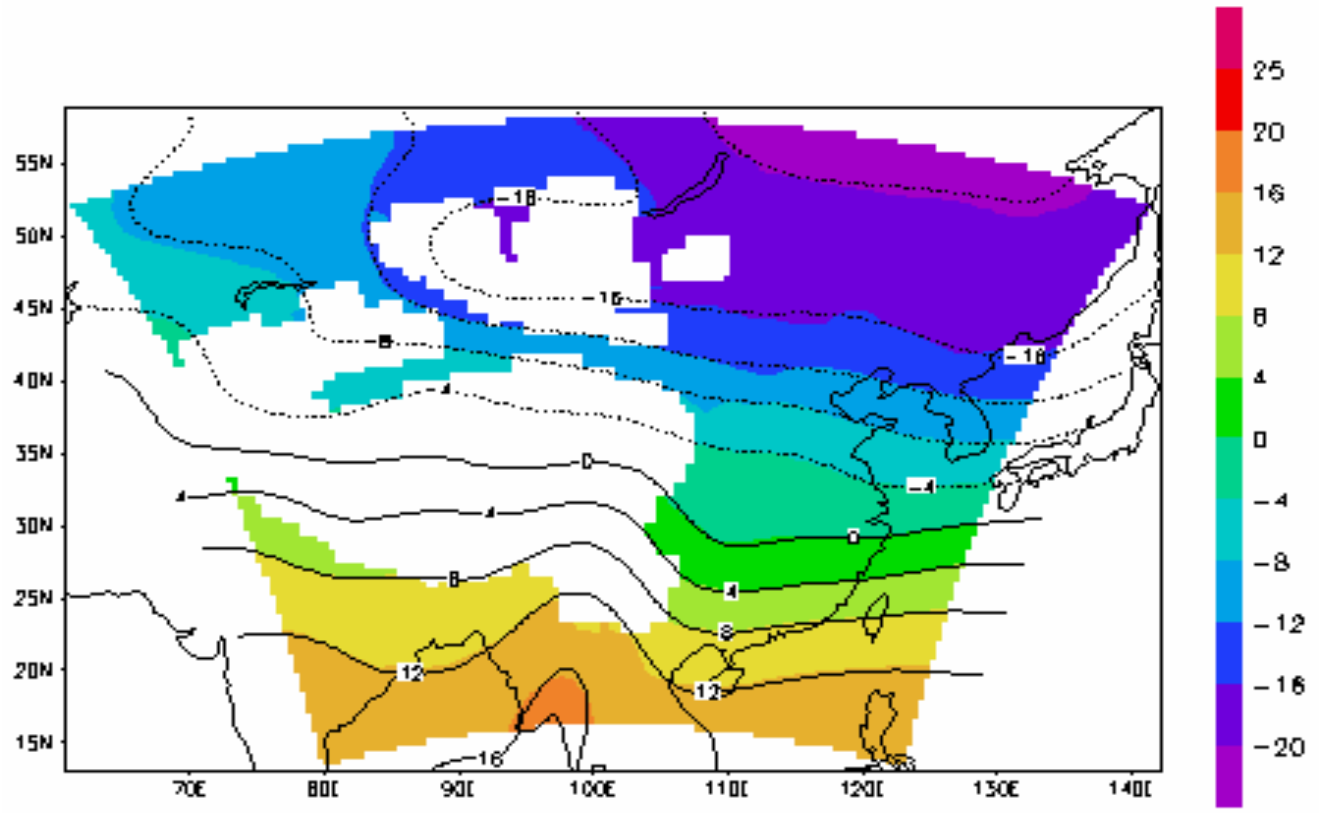


图9. 阳江地震的成功预测

LURR special scan of the Chinese Mainland and the location of Yangjiang earthquake

Long-term climate simulation



95年1月08时850hpa平均气温，图中彩色阴影是模拟结果，等值线是实况分析值。
（空白地区表示该气压层位于地面以下）

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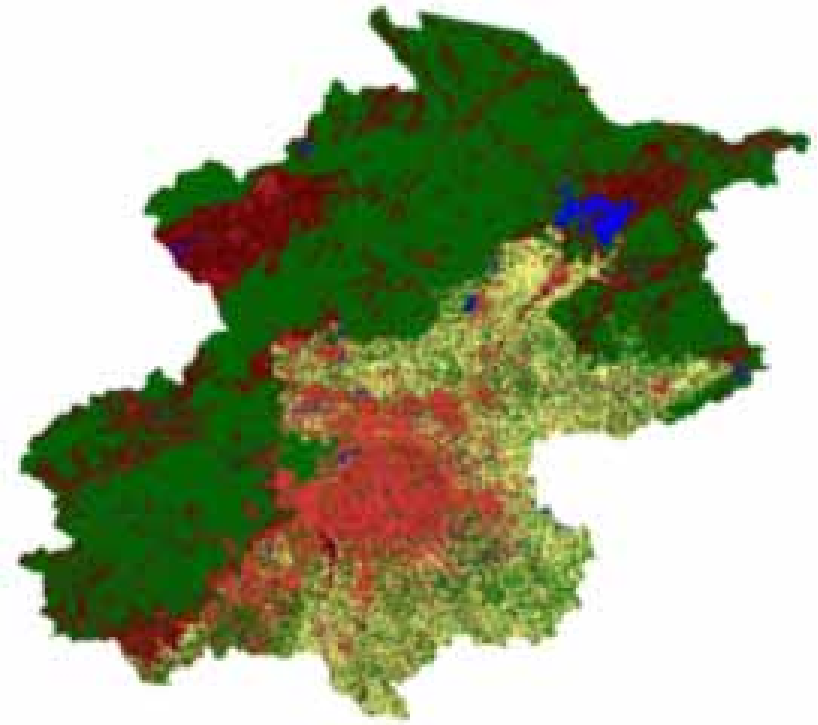
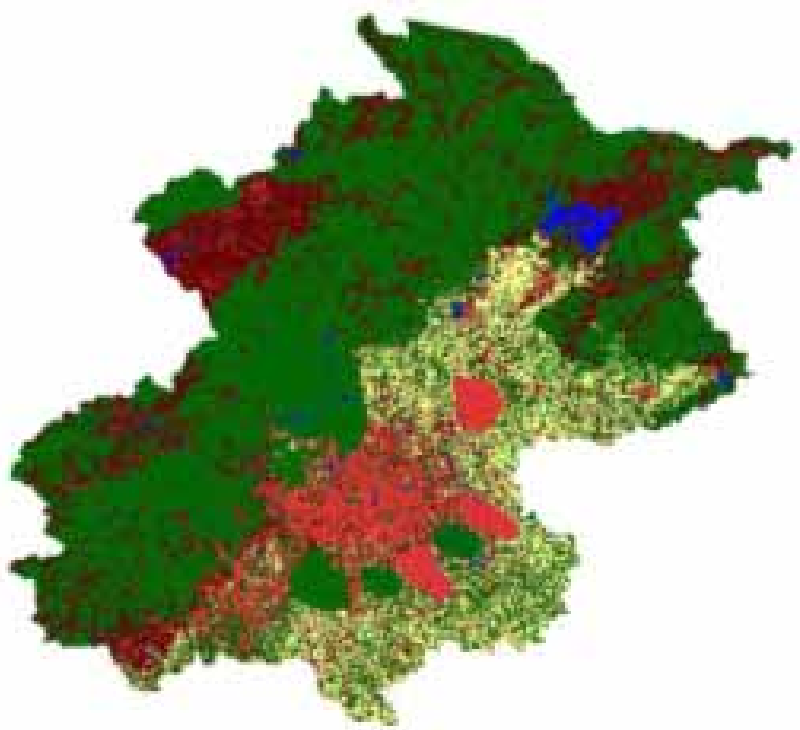
Weather effect on ecosystem and city planning of Beijing

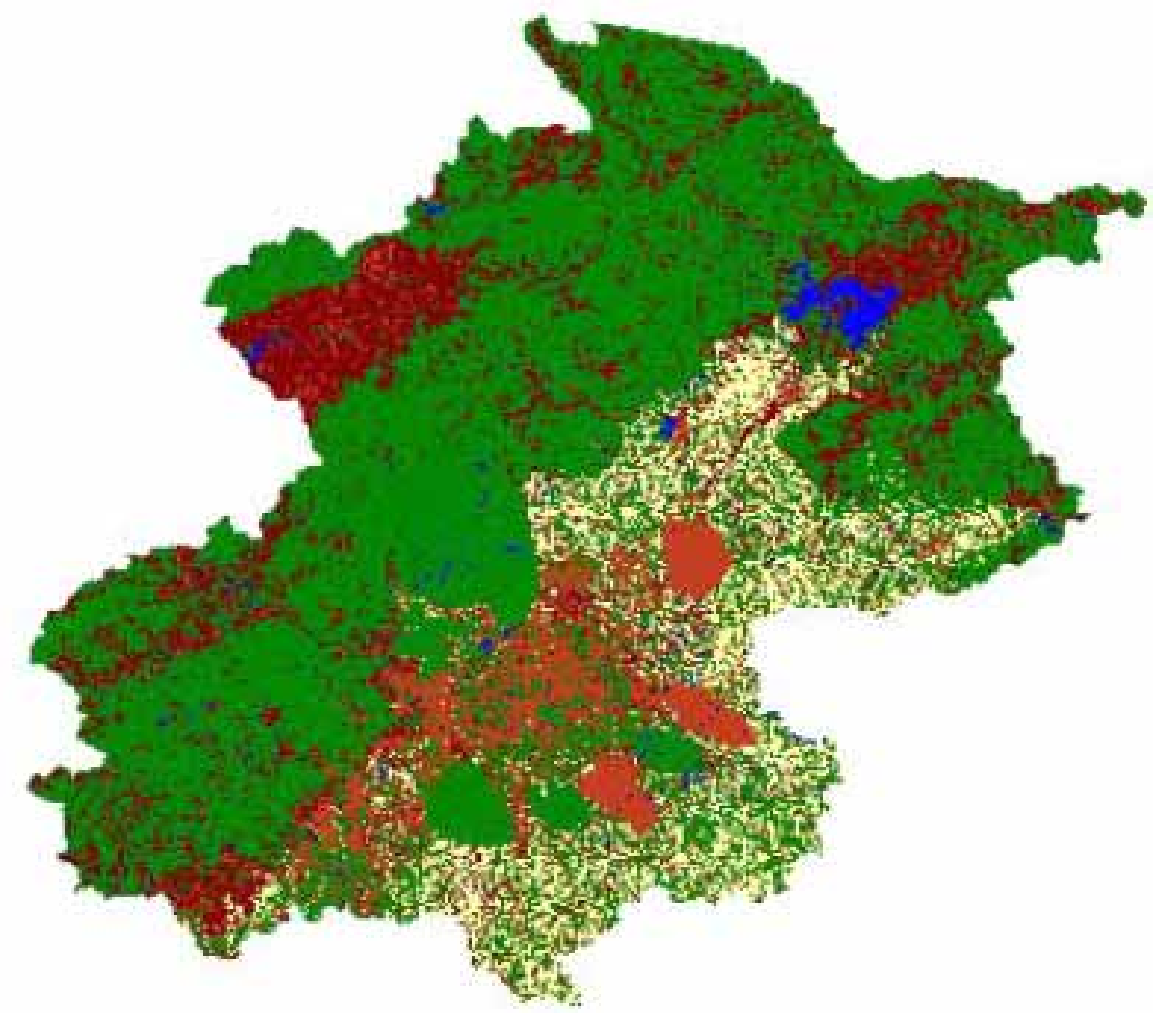


北京市地表覆盖现状



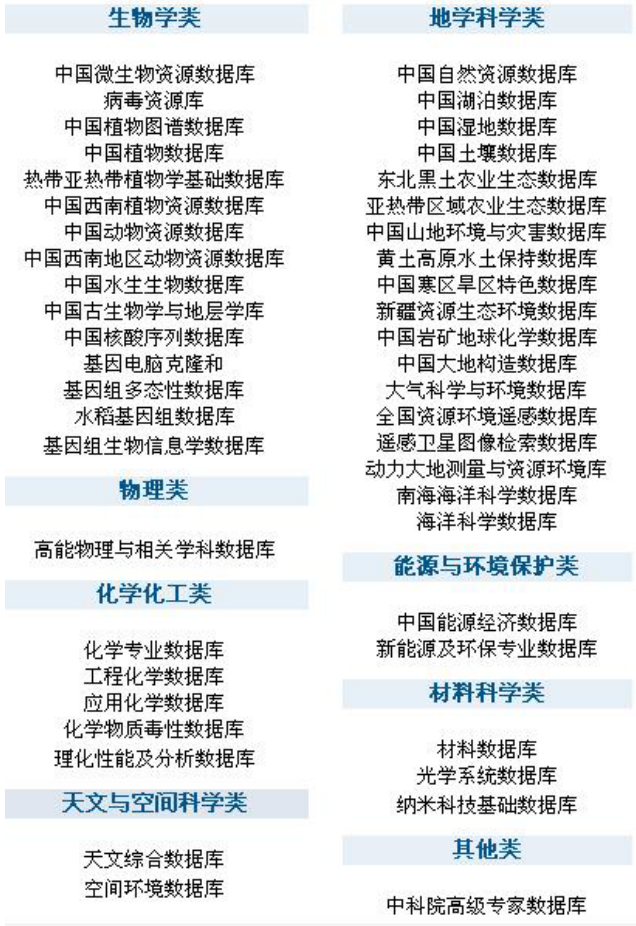
北京市发展规划

Adjusted scheme of Beijing city planning



Scientific Database (SDB)

- 45 institutions across 16 cities
- 503 databases
- 16.6TB+ total volume
- Cover a lot of disciplines
  - Chemistry, Biology, Geosciences, Environment, Astronomy, High energy physics, …



生物学类

中国微生物资源数据库
病毒资源库
中国植物图谱数据库
中国植物数据库
热带亚热带植物学基础数据库
中国西南植物资源数据库
中国动物资源数据库
中国西南地区动物资源数据库
中国水生生物数据库
中国古生物学与地层学库
中国核酸序列数据库
基因电脑克隆和
基因组多态性数据库
水稻基因组数据库
基因组生物信息学数据库

物理类

高能物理与相关学科数据库

化学化工类

化学专业数据库
工程化学数据库
应用化学数据库
化学物质毒性数据库
理化性能及分析数据库

天文与空间科学类

天文综合数据库
空间环境数据库

地学科学类

中国自然资源数据库
中国湖泊数据库
中国湿地数据库
中国土壤数据库
东北黑土农业生态数据库
亚热带区域农业生态数据库
中国山地环境与灾害数据库
黄土高原水土保持数据库
中国寒区旱区特色数据库
新疆资源生态环境数据库
中国岩矿地球化学数据库
中国大地构造数据库
大气科学与环境数据库
全国资源环境遥感数据库
遥感卫星图像检索数据库
动力大地测量与资源环境库
南海海洋科学数据库
海洋科学数据库

能源与环境保护类

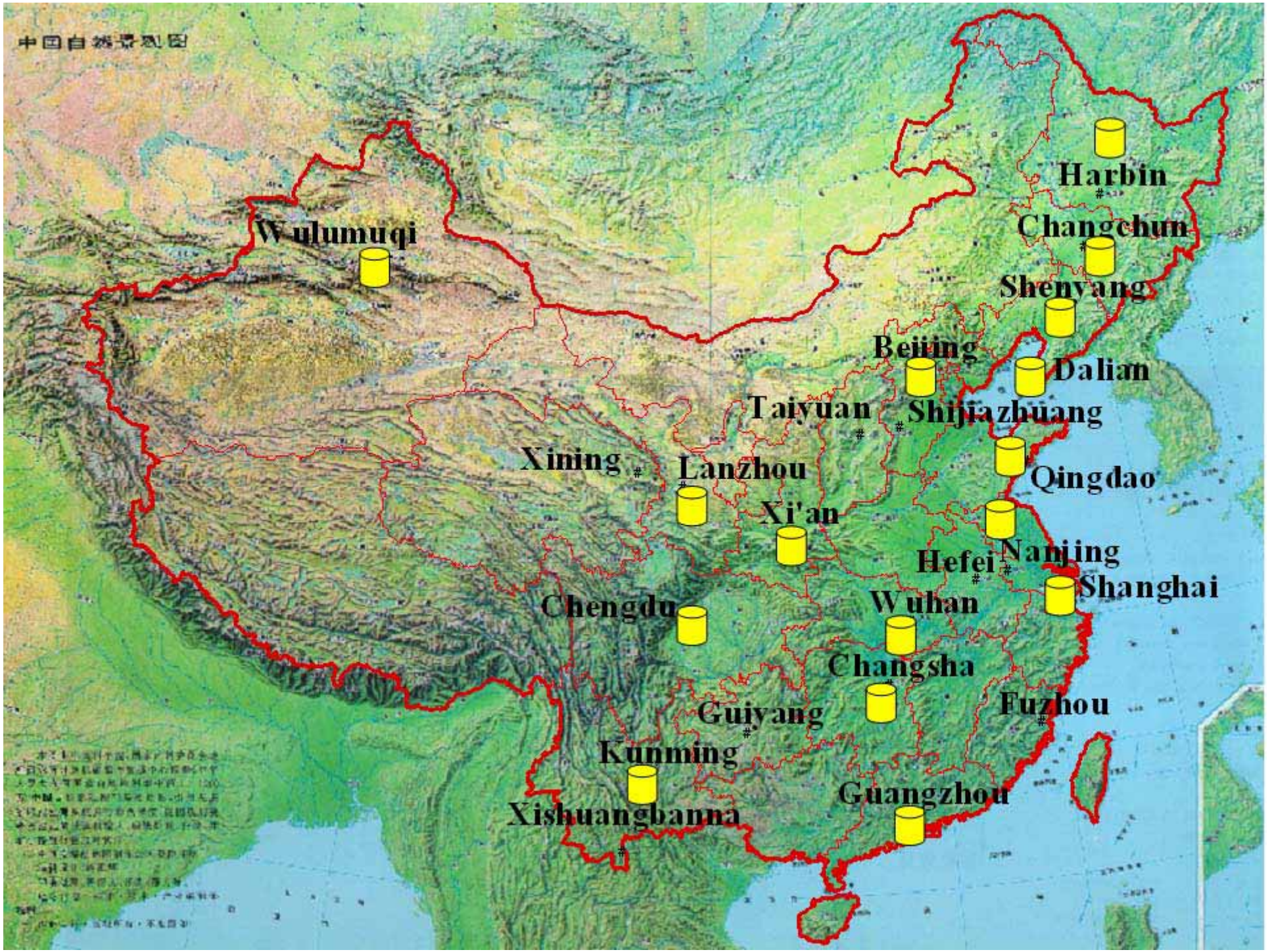
中国能源经济数据库
新能源及环保专业数据库

材料科学类

材料数据库
光学系统数据库
纳米科技基础数据库

其他类

中科院高级专家数据库


中国自然景观图
Harbin
Changchun
Shenyang
Wulumuqi
Beijing
Dalian
Taiyuan
Shijiazhuang
Xining
Lanzhou
Qingdao
Xi'an
Nanjing
Hefei
Shanghai
Chengdu
Wuhan
Changsha
Guiyang
Fuzhou
Kunming
Guangzhou
Xishuangbanna

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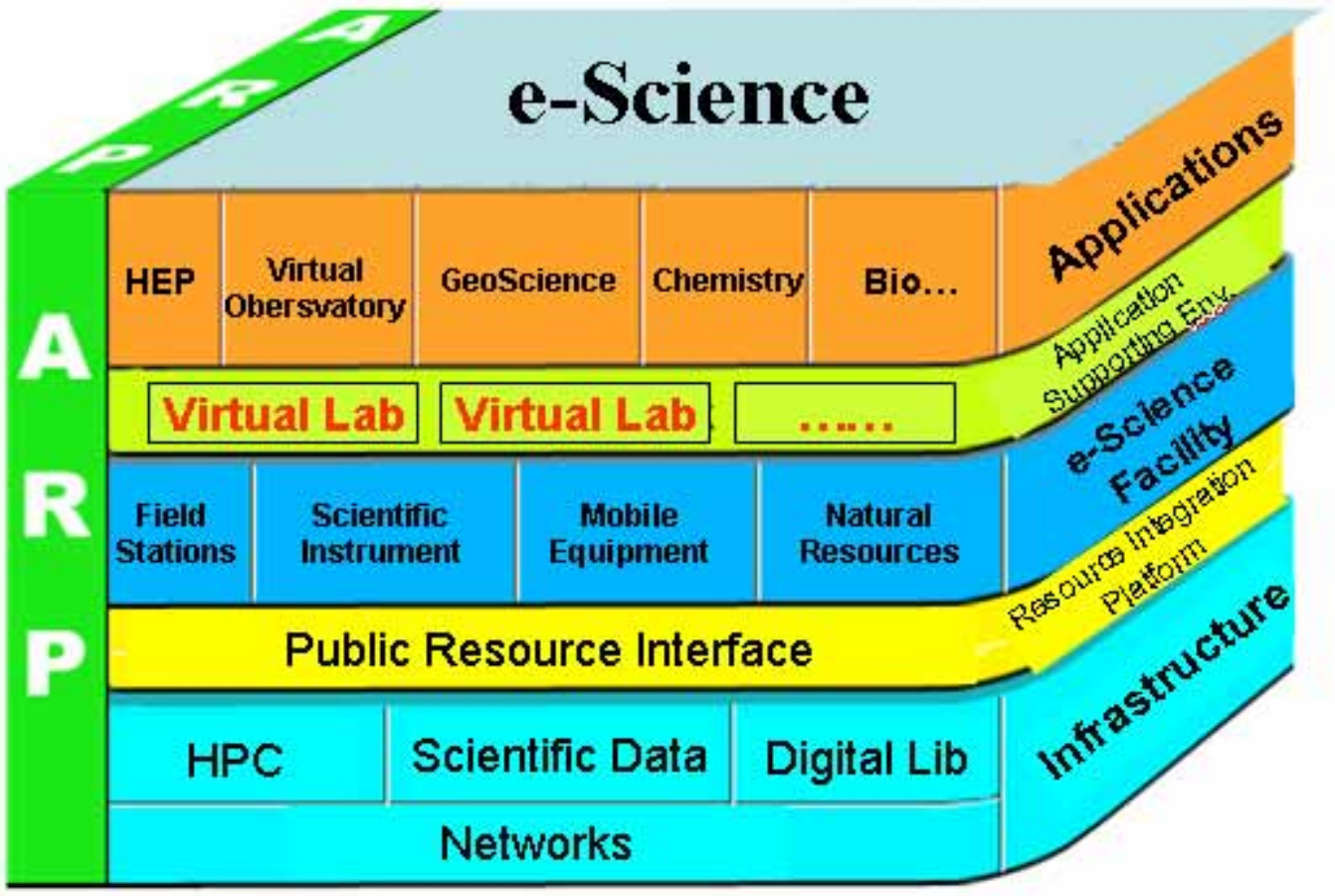
11th Five-year Informatization Program of CAS (2006-2010)

CAS' e-Science Planning in Future(2006-2010)

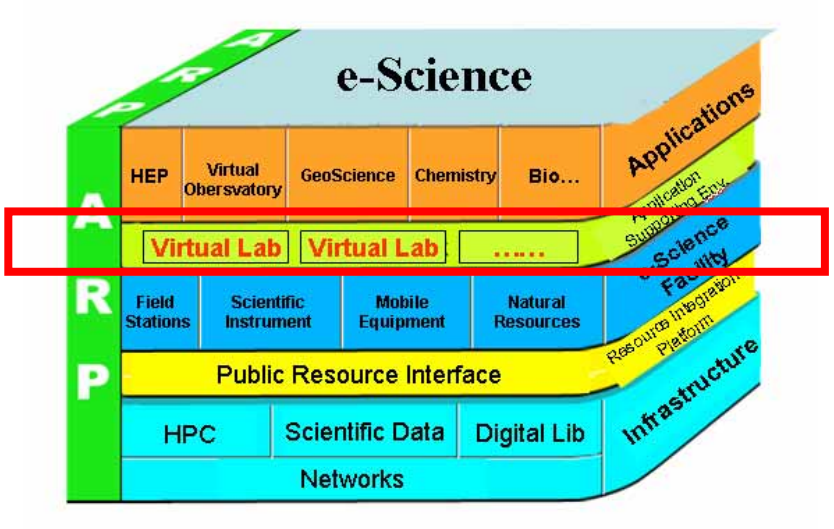
- **CAS 11th Five-year Informatization Program (2006-2010)**
  - Continue to develop the infrastructure and existing applications
    - SDB(600,100T), HPC(.100Tflops), CSTNet(2.5-10Gbps), storage(2-3PB)…
  - e-Science Facility
    - Networks of field stations/instruments(60), Mobile equip., Digital library of natural resources
  - e-Science Applications
    - HEP, Astro, Bio, Geo, Chemistry, …(about 10 or 16)
  - Resource Integration Platform
    - Glue between infrastructure and e-Science facility
  - Supporting Environment for Applications
    - Glue between facility and applications

Framework of CAS e-Science

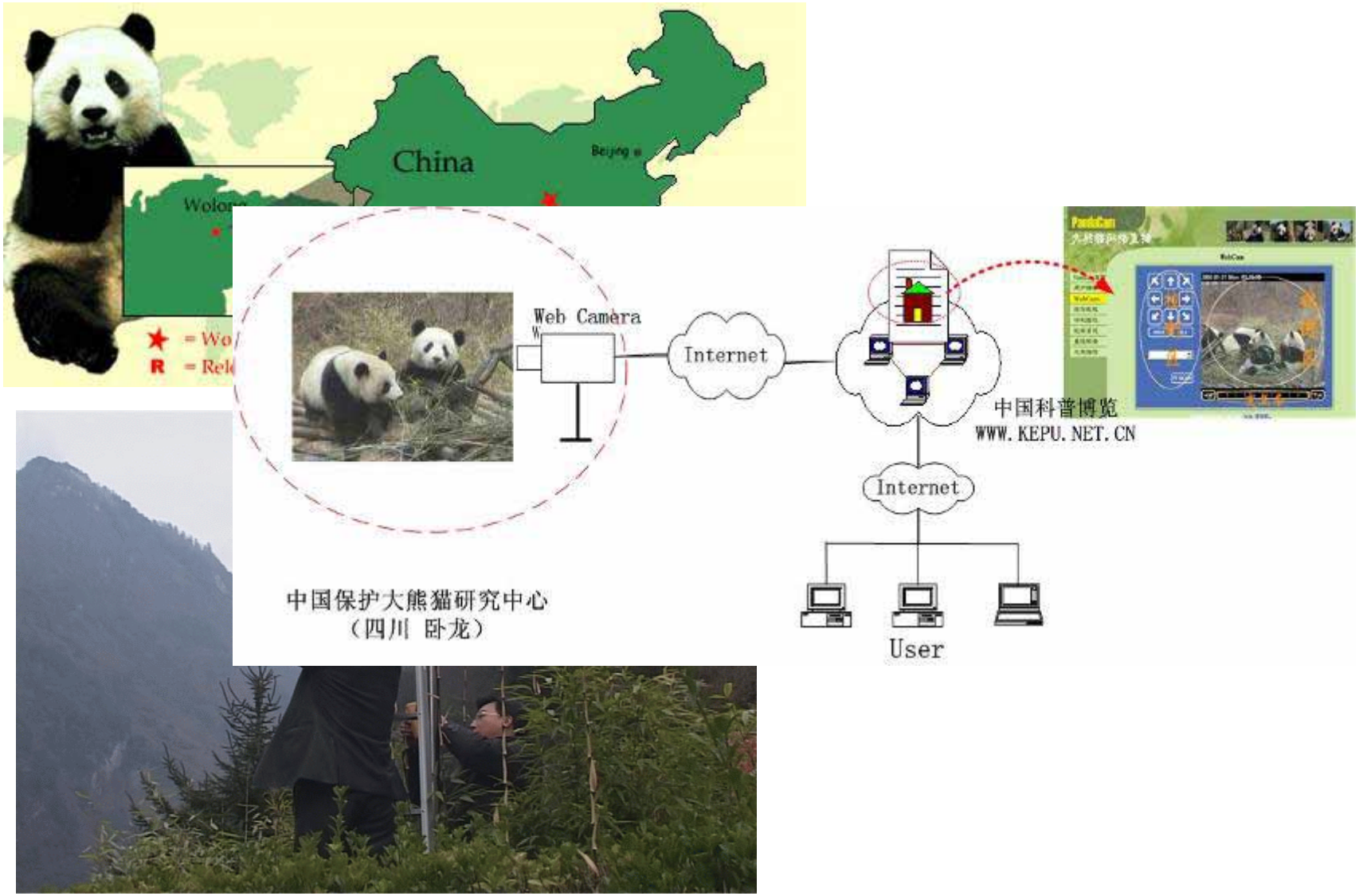


e-Science Virtual Lab

- “Virtual Lab”
- special meanings in the e-Science context
- the key position in our e-Science framework
- the core component to make e-Science a reality



1. Web- Camera in Panda Cam



2. Cosmic Ray Observatories in YBJ, Tibet
--- ARGO, ASr

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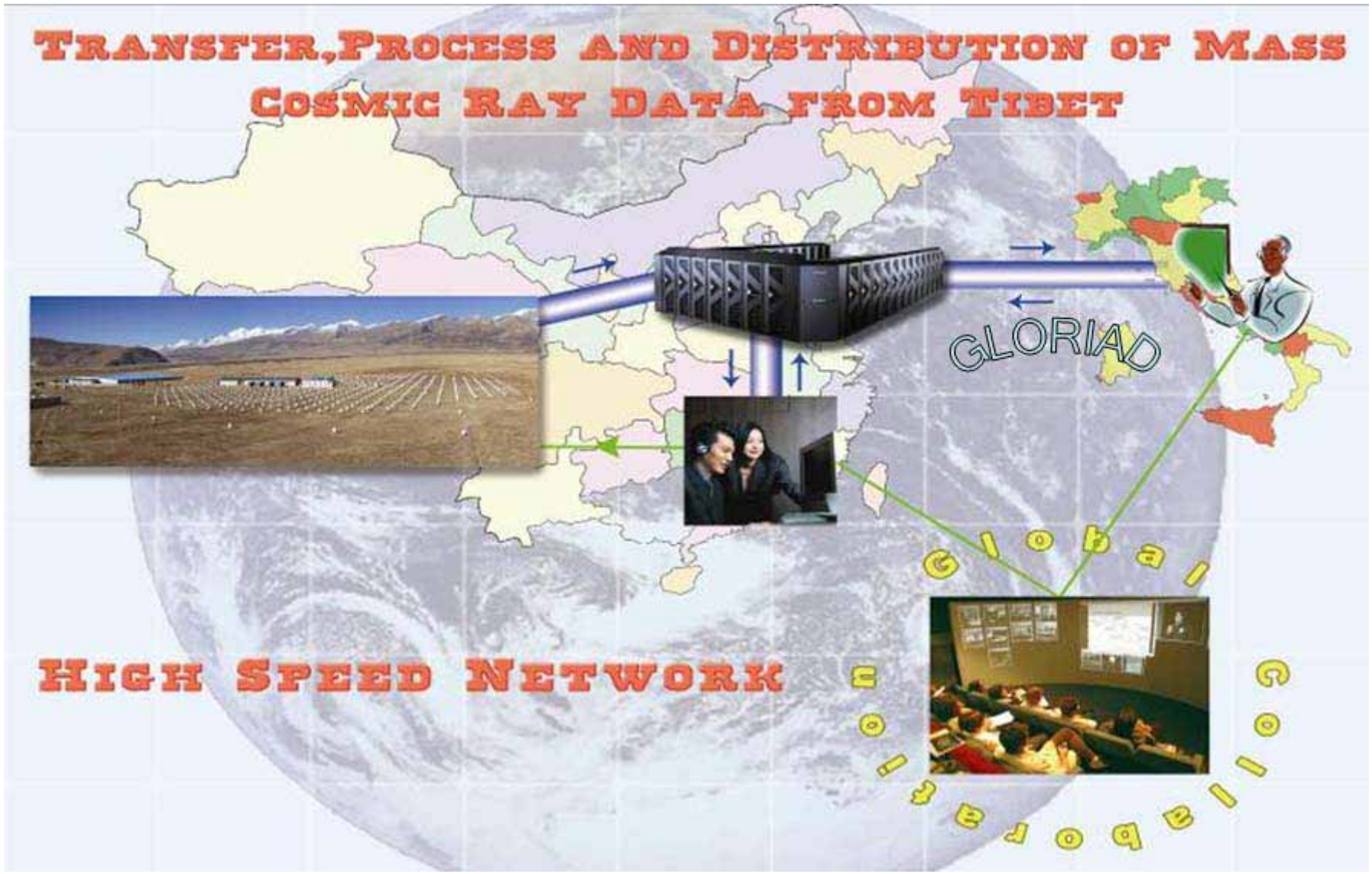

3. VLBI


Hailar
Qiqihar
Harbin
Karamay
MONGOLIA
Chefen Gol
rumqi
Yumen
Hohhot
Beijing
Tianjin
KOREA
Yinchuan
Shijiazhuang
Golmud
Xining
Lanzhou
Taiyuan
Jinan
Yellow River
Yellow Sea
Shiquanhe
Zhengzhou
Xi'an
Nanjing
Hefei
Shanghai
Chengdu
Yangtze River
Chongqing
Lhasa
Nanchang
INDIA
Guiyang
Changsha
Kunming
Nanning
Guangzhou
Macau
Hong Kong
Dongsha Qundao
Haikou
Xisha Qundao
PHILIPPINES

3, China -Japan Collaboration for VLBI

烏魯木齊 (Urumqi)

余山 (Seshan, Shanghai)

- The first China-Japan VLBI experiment was performed with Shanghai-Kashima Baseline in Sep. 1985
- Kashima is one of the most precisely determined positions in Japan : used as the reference point to establish Japan Geodetic Datum 2000 (JGD2000)
- Seshan (Shanghai) is the most precisely determined position in China
- Chinese Academy of Sciences and NICT are both active members of IVS*

* IVS=International VLBI Service for Geodesy and Astrometry

鹿島 (Kashima)

4, Qienghaihu National Natural Reservation Region
-- Bird Island Remote Monitoring

禽流感综合信息平台 - 首页 - 傲游 [Maxthon]

文件(F) 编辑(E) 查看(V) 收藏(A) 快捷组(G) 选项(O) 工具(T) 窗口(W) 帮助(H)

地址 http://159.226.10.99:8080/web/guest/home

禽流感综...

禽流感等突发疾病综合信息平台与预警预报系统

Welcome!
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首页 | 项目介绍 | 项目人员介绍 | 合作单位介绍 | 联系我们 | 搜索...

项目风貌

2006年4月，中科院网络中心工作人员在青海鸟岛安装部署网络监控

同步时钟

新闻

泰国政府呼吁加强防范以遏止禽流感的再度爆发	07-10 19:30
卫生部称03年我国可能有人感染禽流感病毒死亡	07-10 19:32
西班牙首次发现H5N1型禽流感	07-10 19:32
科学家称禽流感通过三条不同途径传入尼日利亚	07-10 19:33
禽流感应用项目内部交流平台培训圆满完成	07-10 19:33
泰国北部扑杀并掩埋200多只鸡 防禽流感再次爆发	07-10 19:39
印尼一男童死于禽流感 成为该国第40个死亡病例	07-10 19:40
深圳人禽流感患者好转 争取一周内脱离呼吸机	07-10 19:40
宁夏爆发禽流感疫情	07-10 19:41
美国疾病控制和预防中心流感疫苗研制动态	07-10 21:33

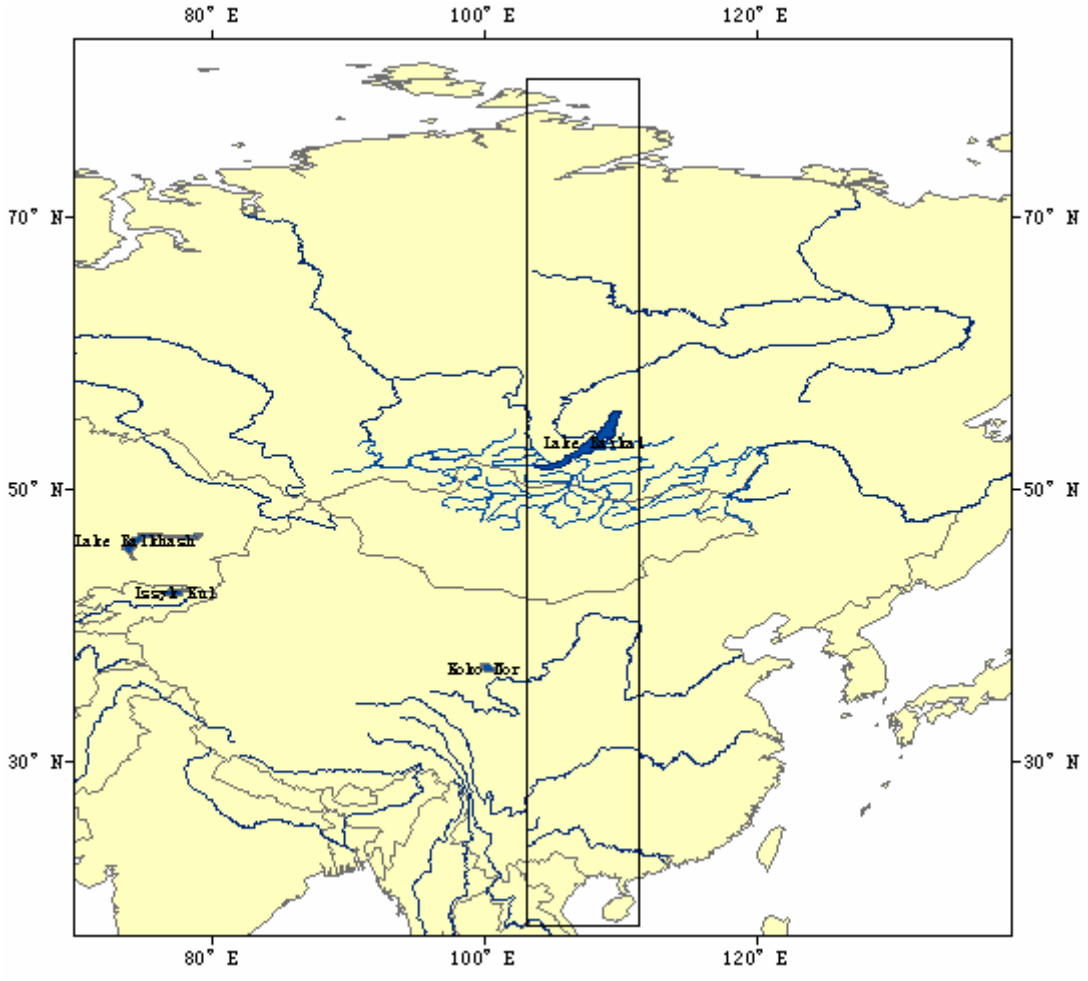
0 210.25.135.80 0 字节 240M 1

开始 未命名 - 画图 禽流感综合信息平... 18:36


BitRate:3845Kbps,FrameRate:25fps
2006/05/14 17:44:36

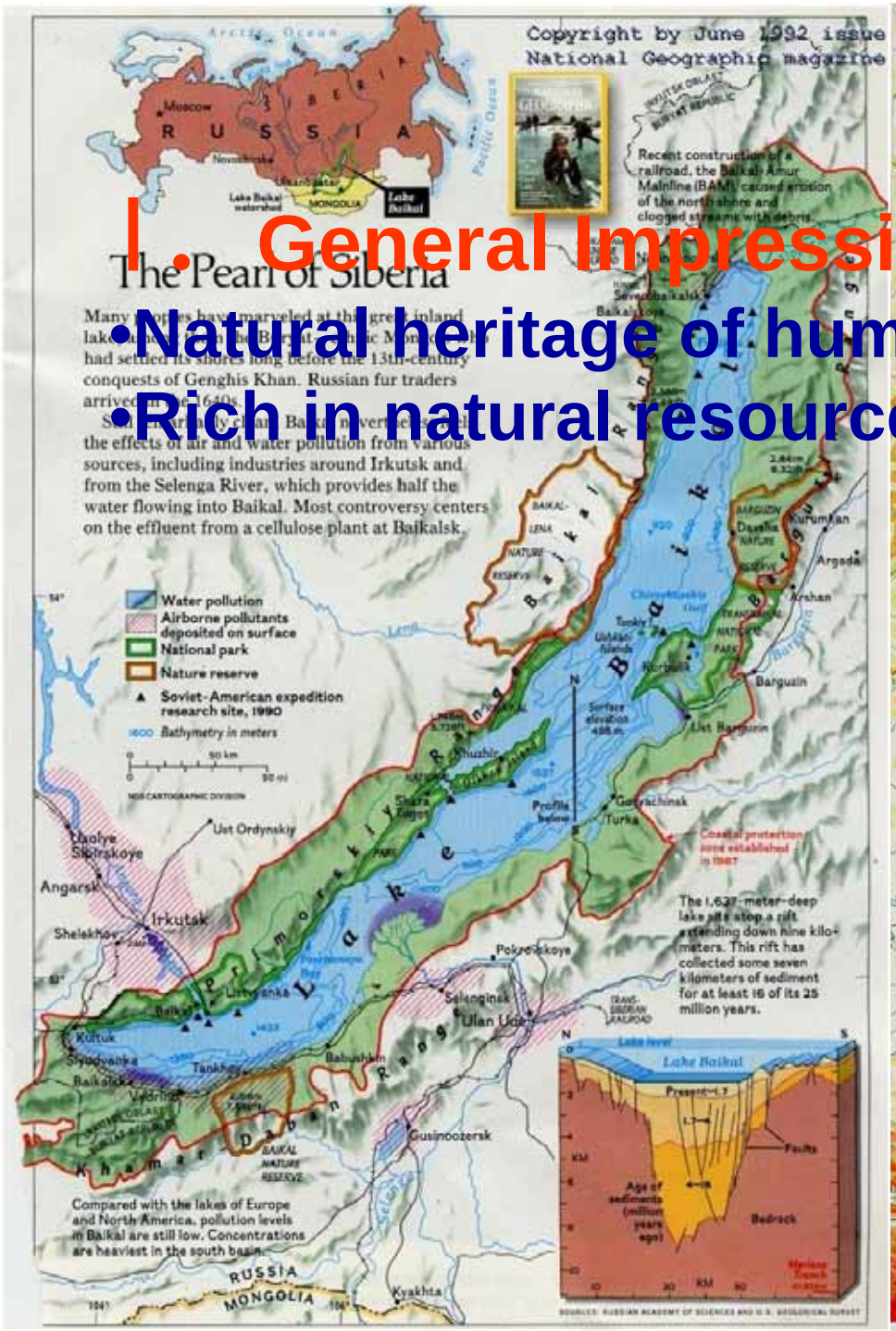
5, East Asia Resource Environment Collaborative Research Network

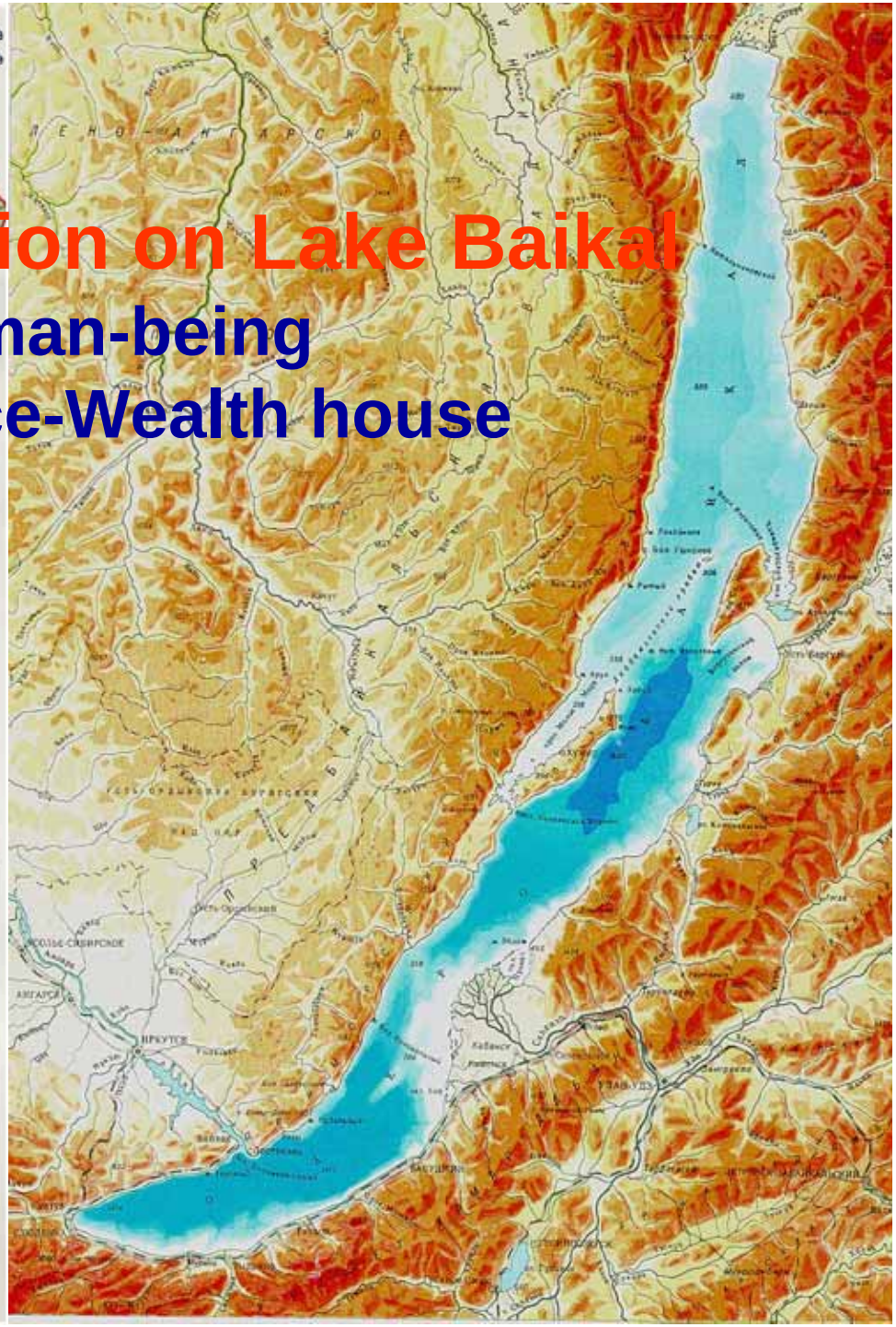
- a network connecting a dozen of institutes and stations from China, Russia and Mongolia
- a series of data products which integrate many relevant databases in this area and support application research
- a platform for int'l collaborative research



I. General Impression on Lake Baikal

- Natural heritage of human-being
- Rich in natural resource-Wealth house





Summary

- Future scientific researches and scientific applications need much more new and useful environment, tools and models
- e-Science or science researches through cyber-infrastructure will be one of the main goals of CAS in the next five years
- e-Science need more international collaborations on cyberinfrastructure and e-Science applications
- Merging scientific domain and IT, not only in IT technology and scientific knowledge, but also in human, e.g. e-scientist

- e-Science or science researches through cyber- infrastructure, especially global lambda network will be one of the main goals of CAS in this five years

- But, we have to face:

  – the gaps between new and old conceptions on the scientific research
  – the gaps between IT engineers and domain researchers
  – new technologies and policies
  – new model for e-science
  – e-scientist training....

So, the best way for e-science in CAS should be:

step by step, case by case, project by project and worldwide cooperation !

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Thank you!