Studies on Digital Watersheds Extraction in China

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Purposes

- For study of hydrological parameters in each of main watersheds

- For to calculate the area of each of main watersheds

- There exists no digital watershed map with coordination and projection at "digital" era.

Data Sources

- SRTM30: resolution is 1km by 1km
- GTOPO30: resolution is 1km by 1km
- China 1:1M DEM: created from 1:1M contour lines
- China 1:250,000 DEM: created from 1:250,000 contour lines

Methods and Outputs

- D8 algorithm is applied to calculate the flow direction

图 6 全国九大流域片分布图

Fig. 6   9 Drainages of China

whole China is divided into 9 drainages, personally, I prefer to replace "drainage" with "hydrological region".

By China Institute of Water Resources and Hydropower Research (IWHR)

图 5 全国一级流域空间分布图

Fig. 5 First Grade Drainage of China
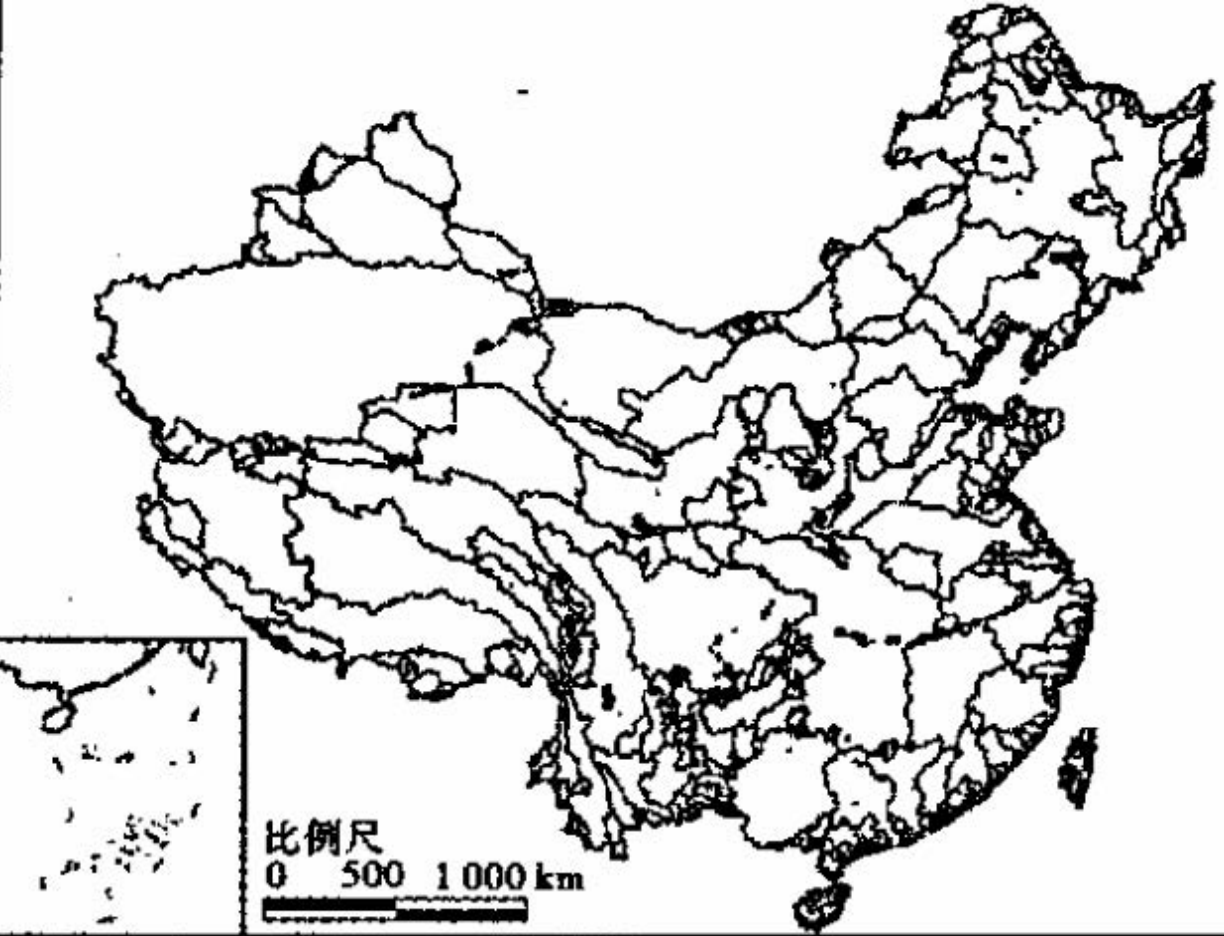
By Xu Xinliang, 2004

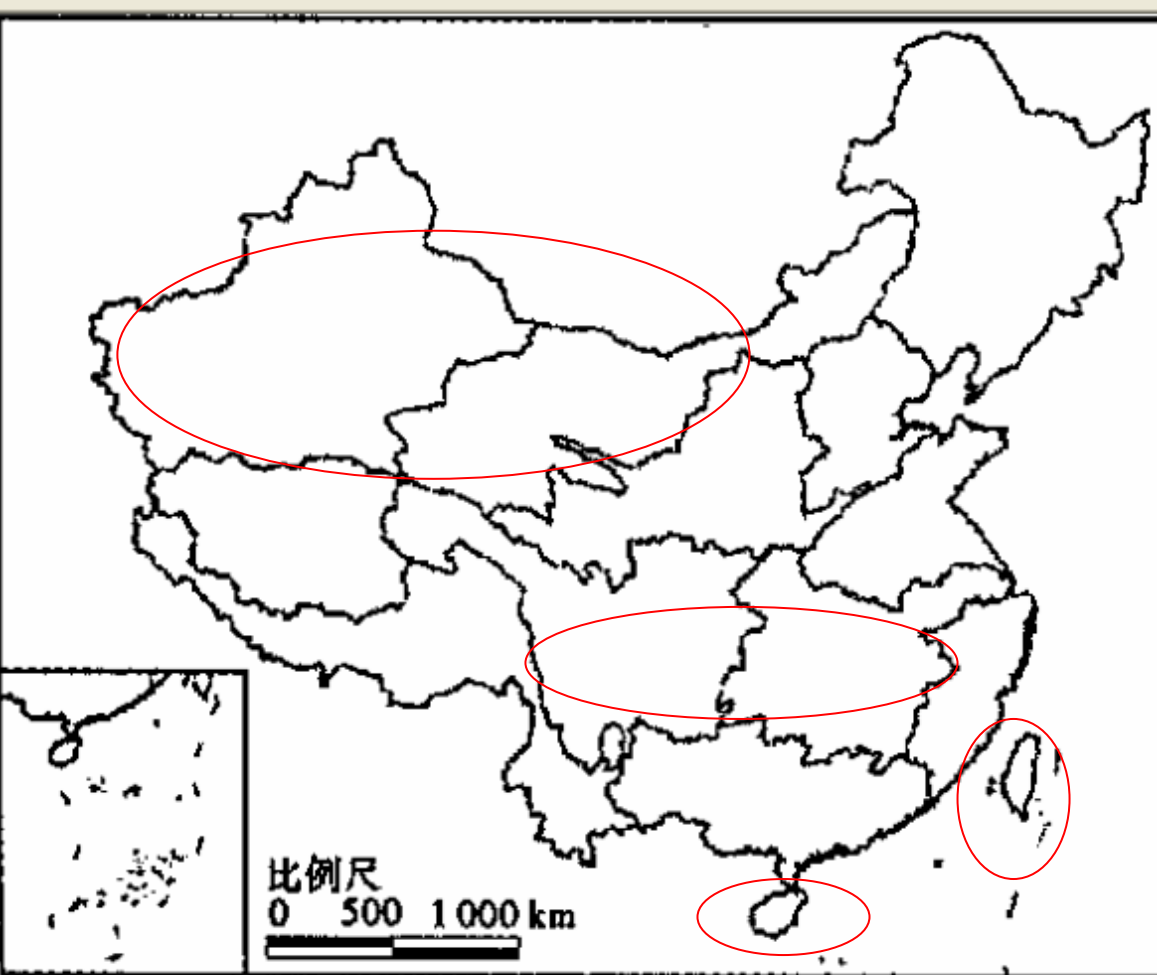Based on 1:1M DEM created from 1:1M digital contour lines.

图 7　全国 14 大流域片分布图

Fig. 7　14 Drainages of China Divided by DEM

By Xu Xinliang, 2004

The map created by IWHR was modified. Inland drainage and Yangtze drainage were divided into two parts, respectively. Hainan and Taiwan were treated independently.

表 1 自动提取流域面积与量测流域面积的比较

Tab. 1 Comparison Between Automated Extraction Area and Surveyed Area

| 子流域名称	自动提取流域面积(km^2)	量测流域面积(km^2)
黑河(至三道营水文站)	1 663.960 0	1 600
白河(至云州水库水文站)	1 197.199 0	1 170
白河(至密云水库水文站)	9 123.242	9 072
潮河(至大阁水文站)	1 916.828 0	1 850
潮河(至下会水文站)	5 456.171 6	5 340
洵河(至罗庄子水文站)	416.423	322
怀河(至怀柔水库水文站)	492.108	526
怀河南支(至前辛庄水文站)	334.214	332
怀河北支(至口头水文站)	157.894	155
青龙湾减河	2 916.754	2 850
北运河(至土门楼水文站)	2 964.126	2 850
凉水河(至榆林庄水文站)	686.33	684

*量测流域面积数据来源于中华人民共和国水文年鉴,1986 年第 3 卷《海河流域水文资料》.

By Xu Xinliang, 2004

Comparison between automated extraction area and surveyed area in selected region. The former is estimated from automated extracted map at a scale of 1:250,000.

Not a systematically analysis.
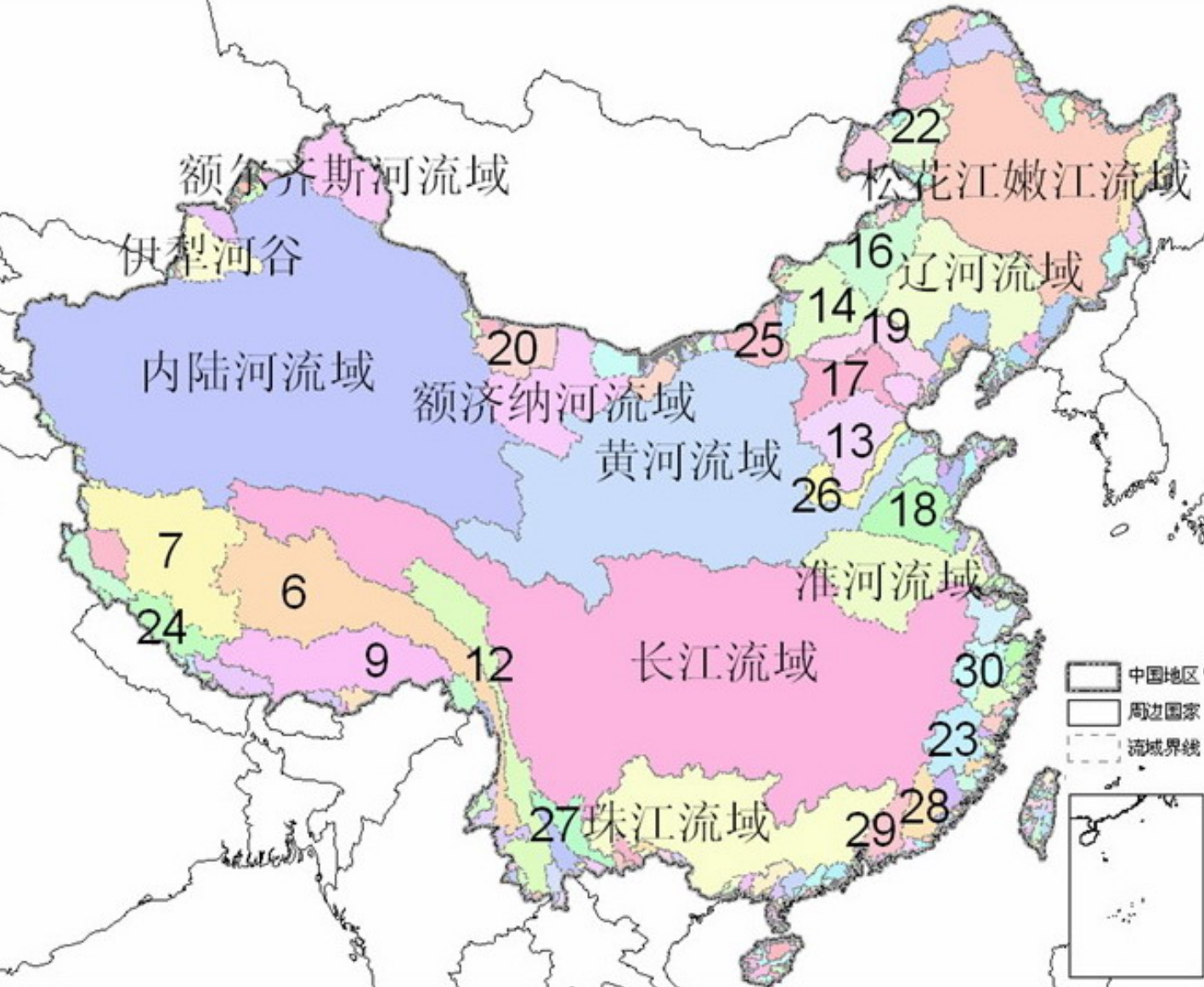
D8 algorithm is applied to area within the boundary of China, other area is treated as no data, based on SRTM 30

Legend:
中国地区
周边国家
流域界线
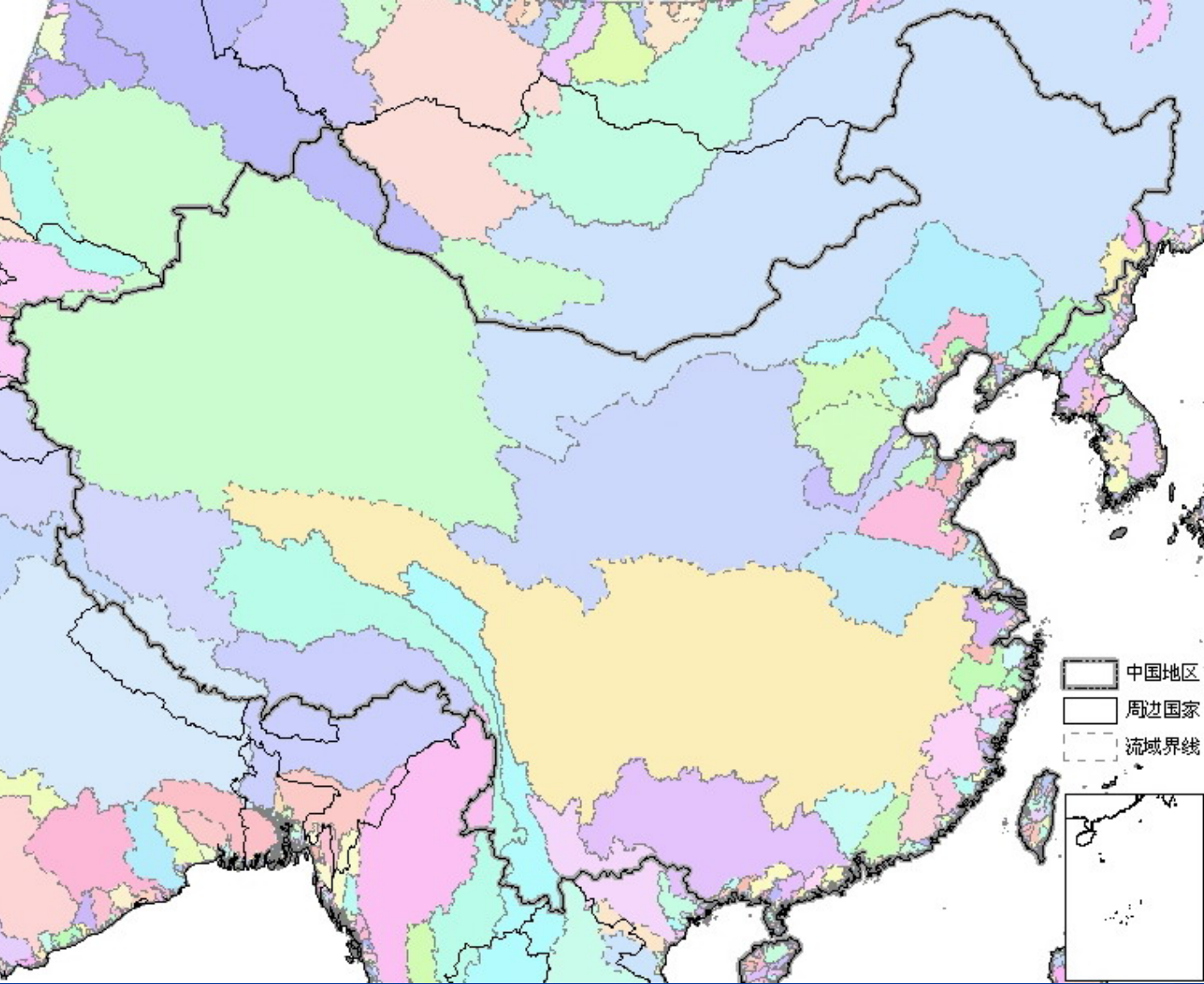
D8 algorithm is applied to rectangle area between 70-140E and 15-55N, which covers whole China and its neighboring regions, based on SRTM 30

The outlet of Yellow River should be here (pointed by red arrow),

D8 algorithm is applied to rectangle area between 70-140E and 15-55N, based on GTOPO30

Id	Name	Area(Km²)	%
#1	Inland Rivers	1,865,198	19.85
# 2	Yangtze River	1,839,084	19.57
# 3	Yellow River	980,060	10.43
# 4	Songhuajiang & Nenjiang River	545,037	5.80
# 5	Zhujiang River	386,265	4.11
# 6	6	324,912	3.46
# 7	7	247,221	2.63
# 8	Liaohe River	222,697	2.37
# 9	9	190,038	2.02
# 10	Huaihe River	183,563	1.95
# 11	Ejina River	158,771	1.69
# 12	12	145,367	1.55
# 13	13	101,347	1.08
# 14	14	91,201	0.97
# 15	Eerqisi River	84,820	0.90
# 16	16	83,205	0.89
# 17	17	74,877	0.80
# 18	18	74,302	0.79
# 19	19	64,194	0.68
# 20	20	56,467	0.60
# 21	Ili Valley	54,888	0.58
# 22	22	54,466	0.58
# 23	23	52,340	0.56
Sum		**7,880,330**	**83.86**

Future work

- Potentially, we can use TM/ETM+ images to check the boundary of watershed. Currently, this work can be done in Google Earth, we may do it next year when we finish the mosaic of TM/ETM+ for whole China.

- Extraction of sub-watersheds in each first level watershed.