

Klimawandel in Zentralasien 中亚的气候变化

Kurt **ROTH**

Institute of Environmental Physics

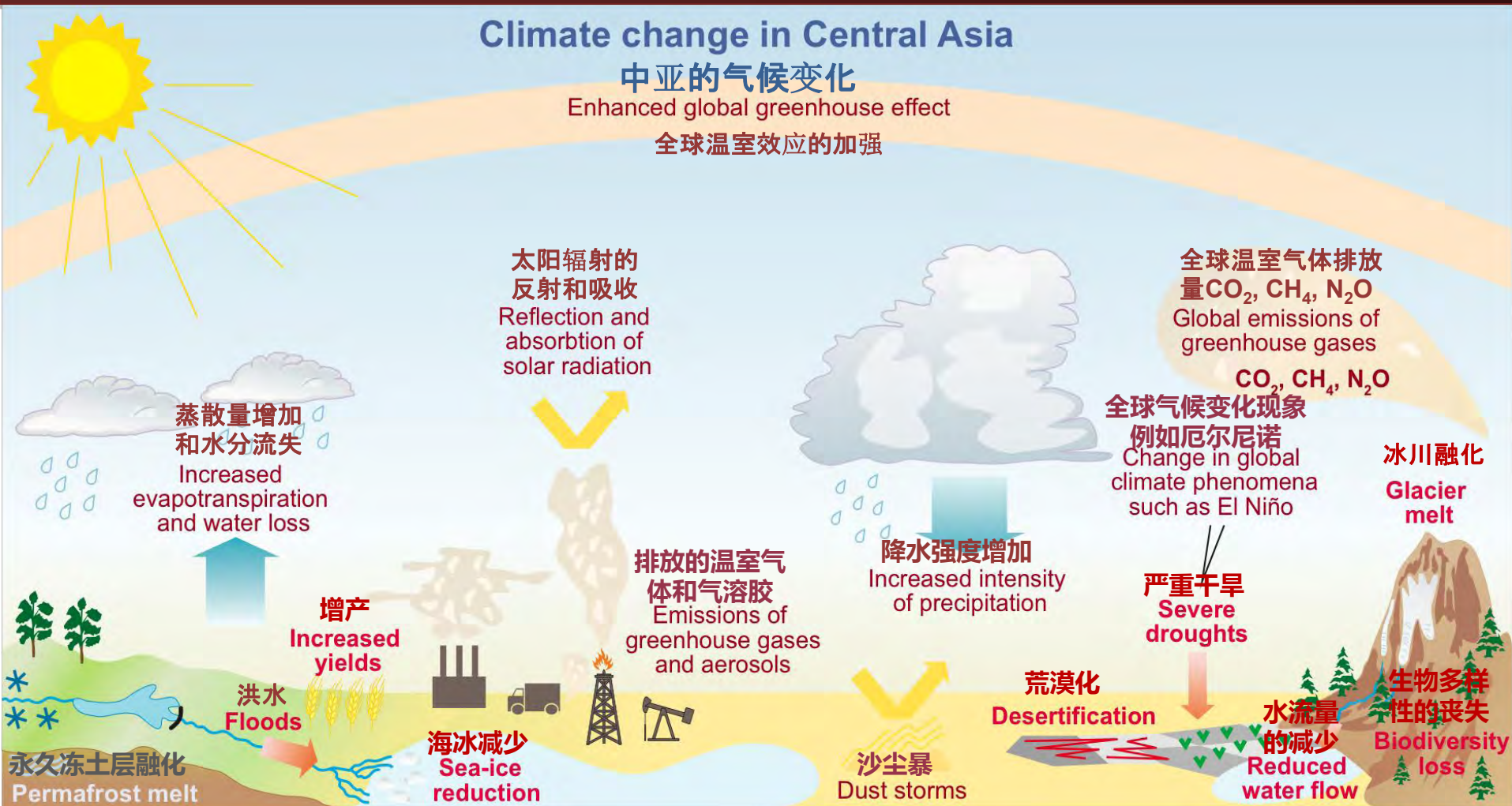
Heidelberg University

海德堡大学环境物理研究所

www.iup.uni-heidelberg.de



Klimawandel: Prozesse 气候变化：进程



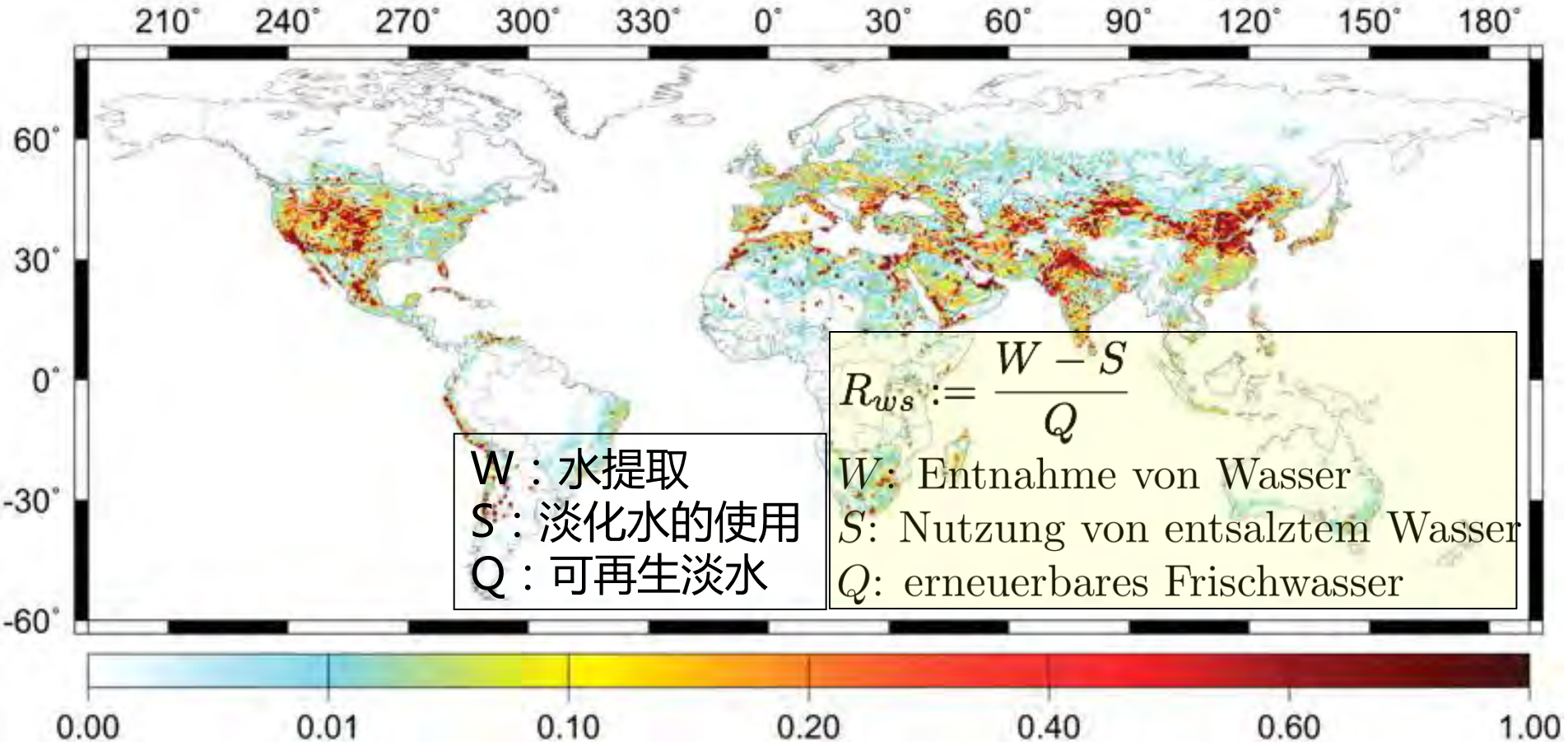
[Novikov et al., 2009]

Globaler Wasserkreislauf 全球水循环



[Oki and Kanae, 2006]

Index für Wassermangel 缺水指标



[Oki and Kanae, 2006]

Wasser für Ernährung 为了给养的水

70% of water withdrawal for food production

- 1 kg of plant dry mass: 400...750 kg of water
- 1 kg of rice: 1'000...3'000 kg of water
- 1 kg of beef: 15'000 kg of water

40% of food produced from irrigated land

- 2.4 10^6 km² (1.6% of land area) irrigated with 1.2 m/y
- ↳ 2.9 10^3 km³/y, **50...80% lost to ET**

how much is 2.9 10^3 km³/y?

- 2.5% of total precipitation on land
- available runoff: 12.5 10^3 km³/y
- 23% used for irrigation**

regional impact often more severe

- Aral Sea lost 70% vol since 1960
- Huang He, Nile, Colorado,... regularly trickle out inland

70%的水用于粮食生产

- 1公斤植物干重：400...750公斤水
- 1公斤大米：1000...3000公斤水
- 1公斤牛肉：15000公斤水

40%的食物生产源自灌溉土地

- 2.4 10^6 平方公里 (1.6%的土地面积) 每年灌溉1.2米
- 2.9 10^3 立方米/年，50...80%损失ET

2.9 10^3 立方米/年是多少？

- 总降水量的2.5%在陆地
- 有效径流：12.5 10^3 立方米/年
- 23%用于灌溉**

区域影响往往更为严重

- 自1960年以来咸海减少了70%
- 黄河，尼罗河，科罗拉多...通常慢慢流出内陆

Zentralasien: Geographie

中亚：地理

Mountain ranges and deserts in Central Asia
中亚的山脉和沙漠



[Novikov et al., 2009]

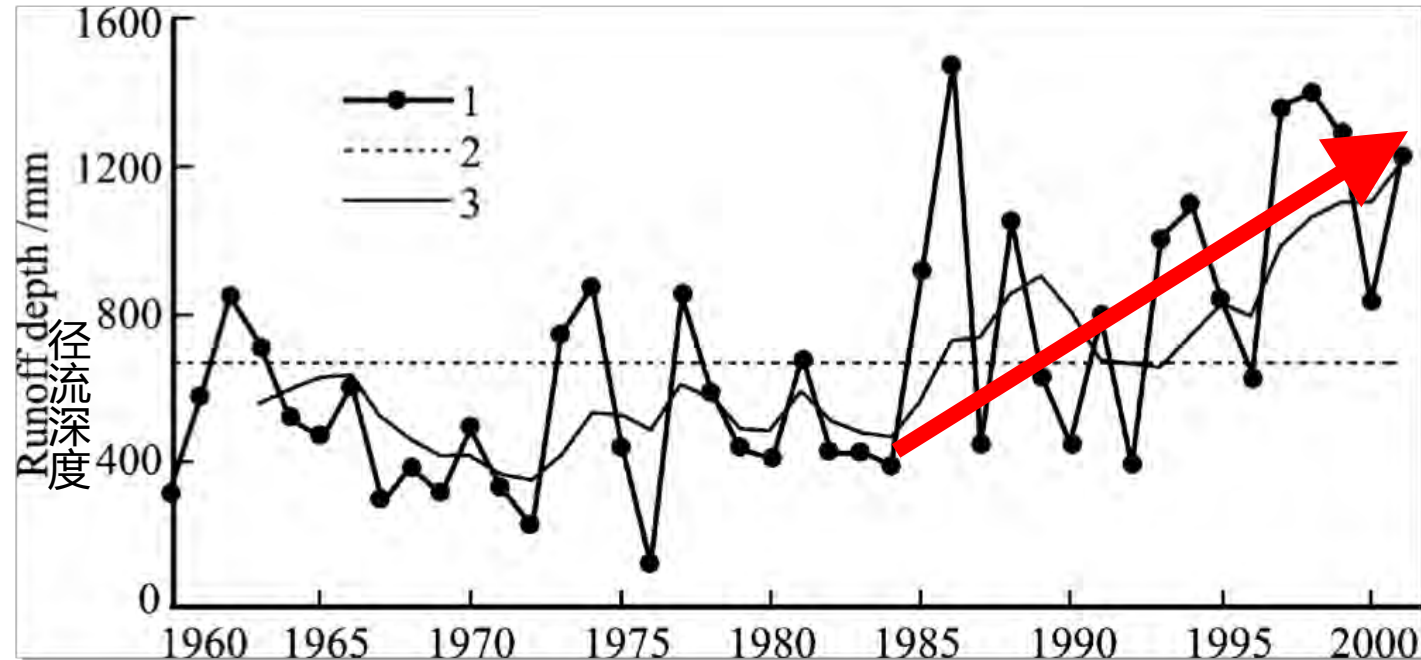
- Areas above 2000 m
2000米以上区域
- Mountain systems
山系
- Deserts
沙漠

Klimawandel: Anfälligkeit – Anpassungskapazität

气候变化：缺乏抵抗力-适应力



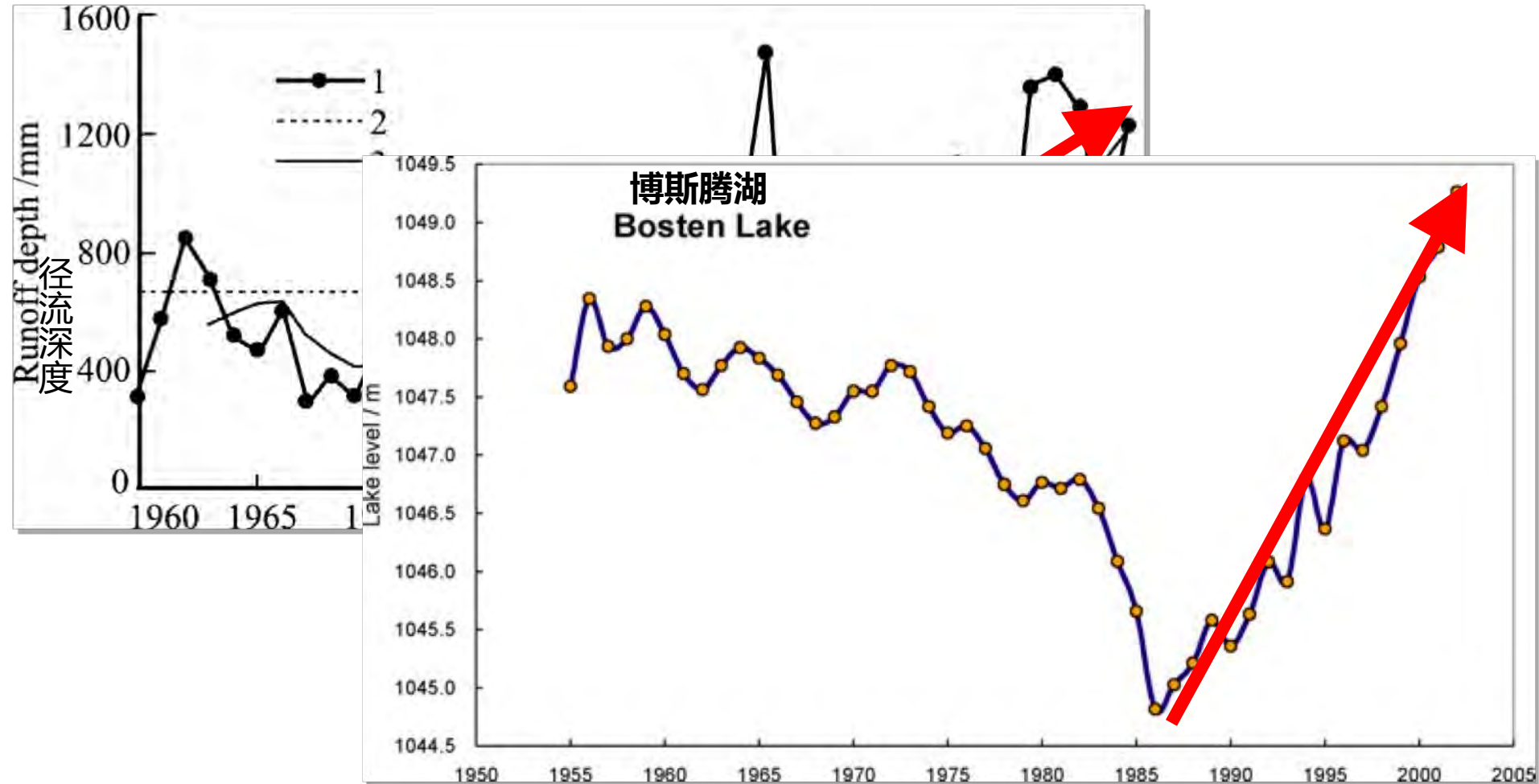
Flüsse, Seen 河流，湖泊



Abfluss Gletscher No. 1, Urumqi-Fluss [Shi et al., 2006]

一号冰川径流，乌鲁木齐河

Flüsse, Seen 河流, 湖泊

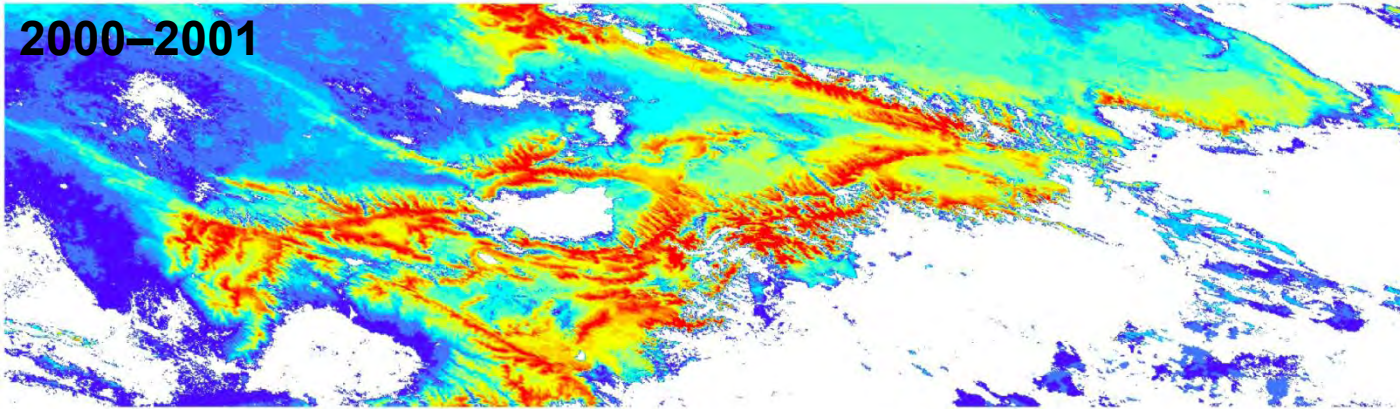


Seespiegel, Bosten-See [Shi et al., 2006]

湖面, 博斯腾湖

Tien Shan: Anzahl Tage mit Schnee 天山：降雪天数

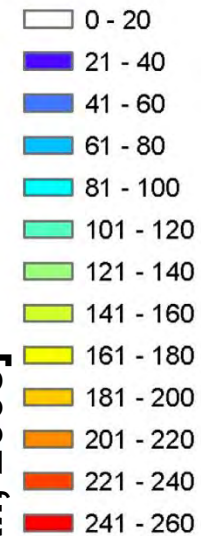
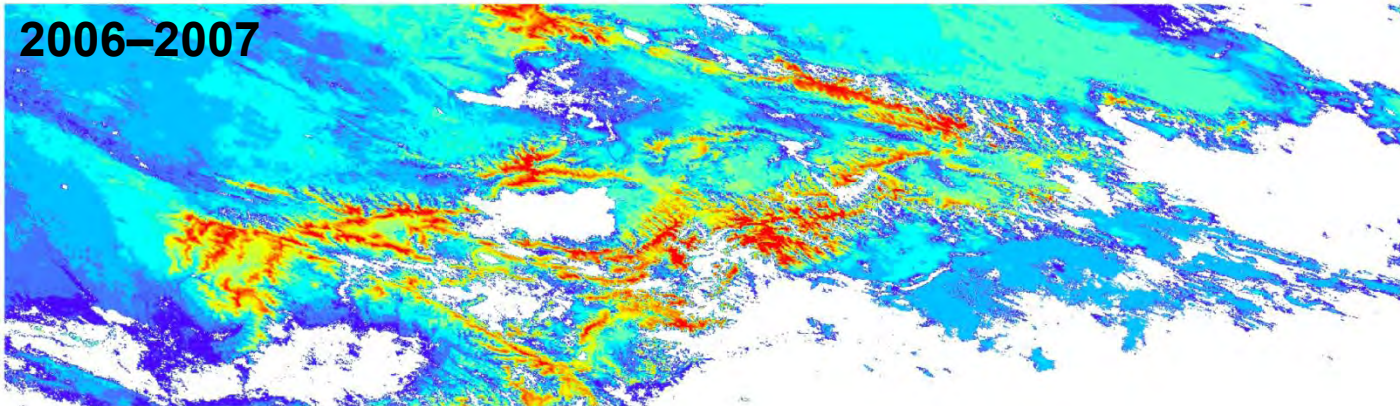
2000–2001



schneebedeckte Fläche im Tien Shan nahm ab,
um etwa 15% (320'00 km²)

冰雪覆盖的天山面积减少，约15% (32000平方公里)

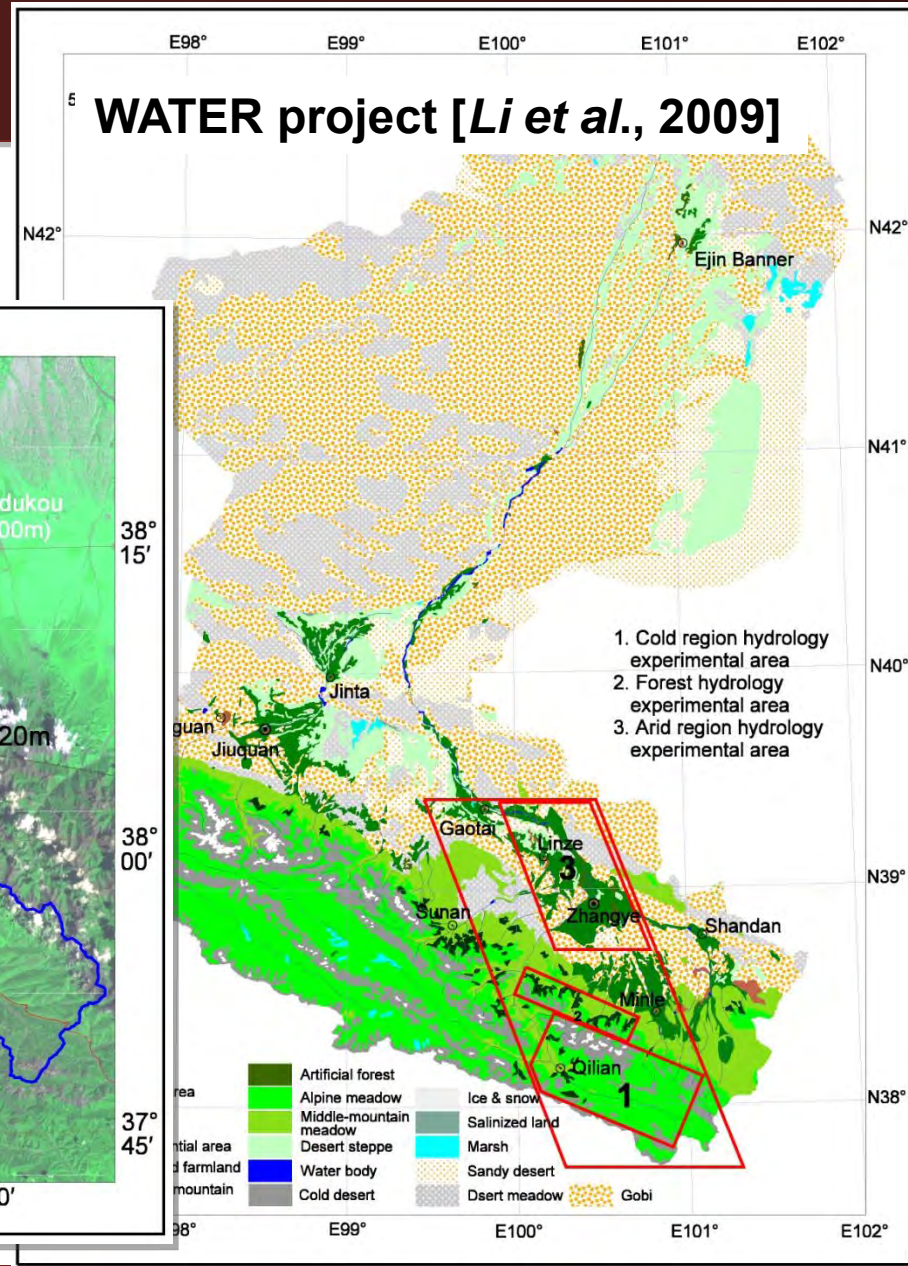
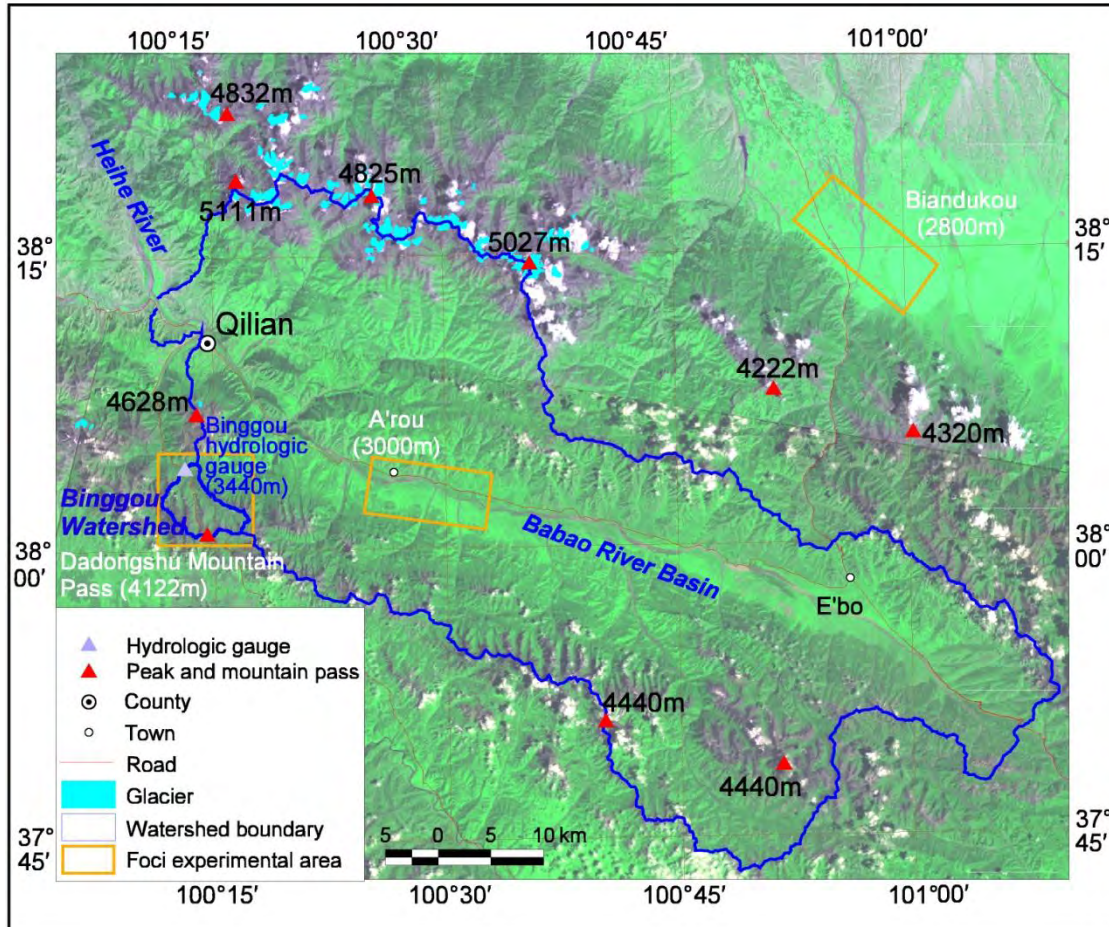
2006–2007



[Aizen et al., 2008]

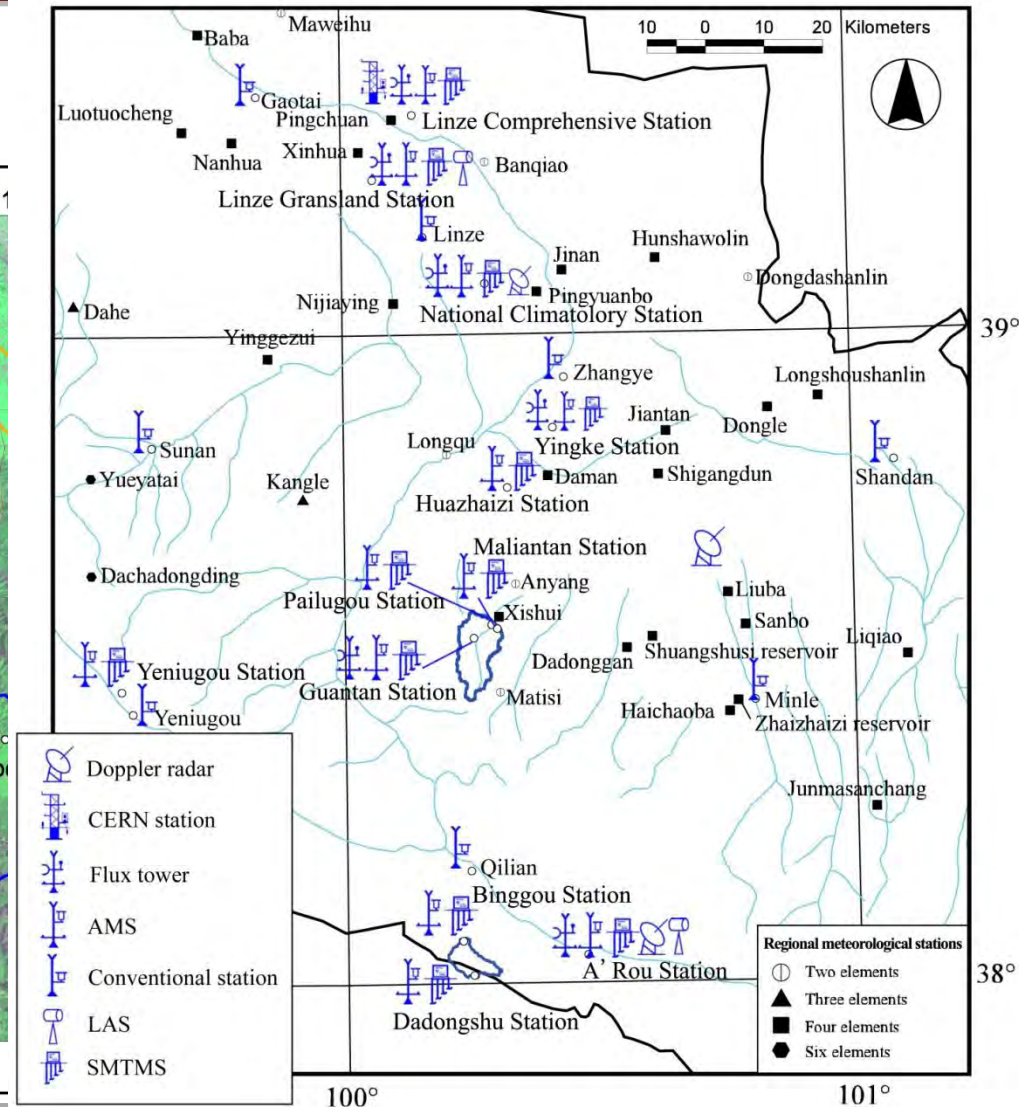
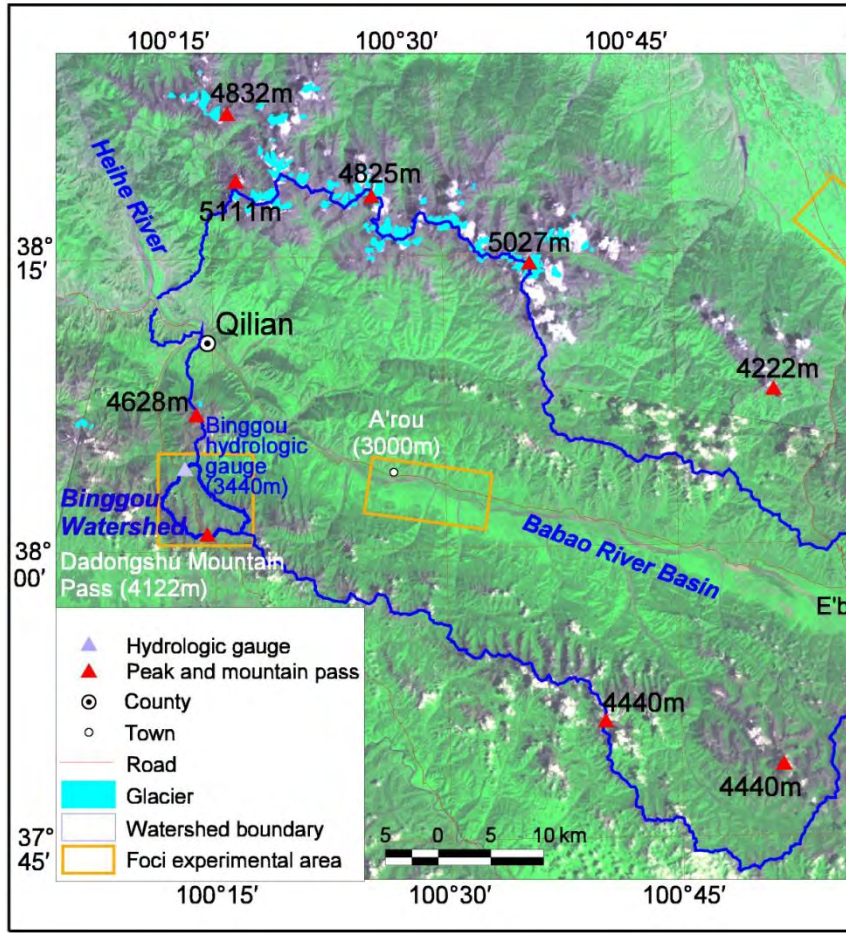
Klimawandel: Was tun? 气候变化：做什么？

- beobachten – erkennen
观察-识别



Klimawandel: Was tun? 气候变化：做什么？

- beobachten – erkennen
观察-识别



Klimawandel: Was tun? 气候变化：做什么？

- beobachten – erkennen
观察-识别
- modellieren – verstehen
模型-理解
- handeln 处理
 - vermeiden 避免
 - abschwächen 减轻
 - anpassen 适应

Klimawandel: Was tun in RECAST Urumqi? 气候变化：本项目做什么？

- beobachten – erkennen
观察-识别
- modellieren – verstehen
模型-理解
- handeln 处理
 - vermeiden 避免
 - abschwächen 减轻
 - anpassen 适应

kleines Projekt: 小项目:
anhand von Beispielen
mit Schwerpunkt auf
Transfer von Wissen & Technologie
以知识与技术转移为重点的相关案例