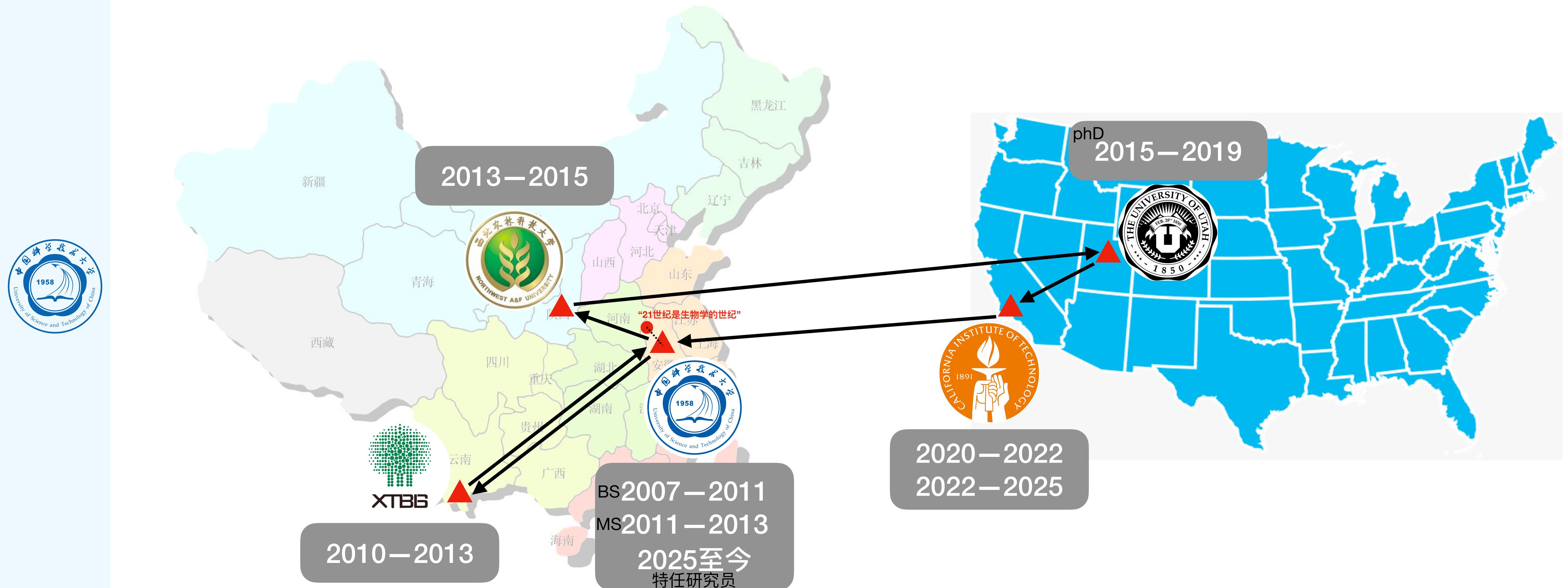


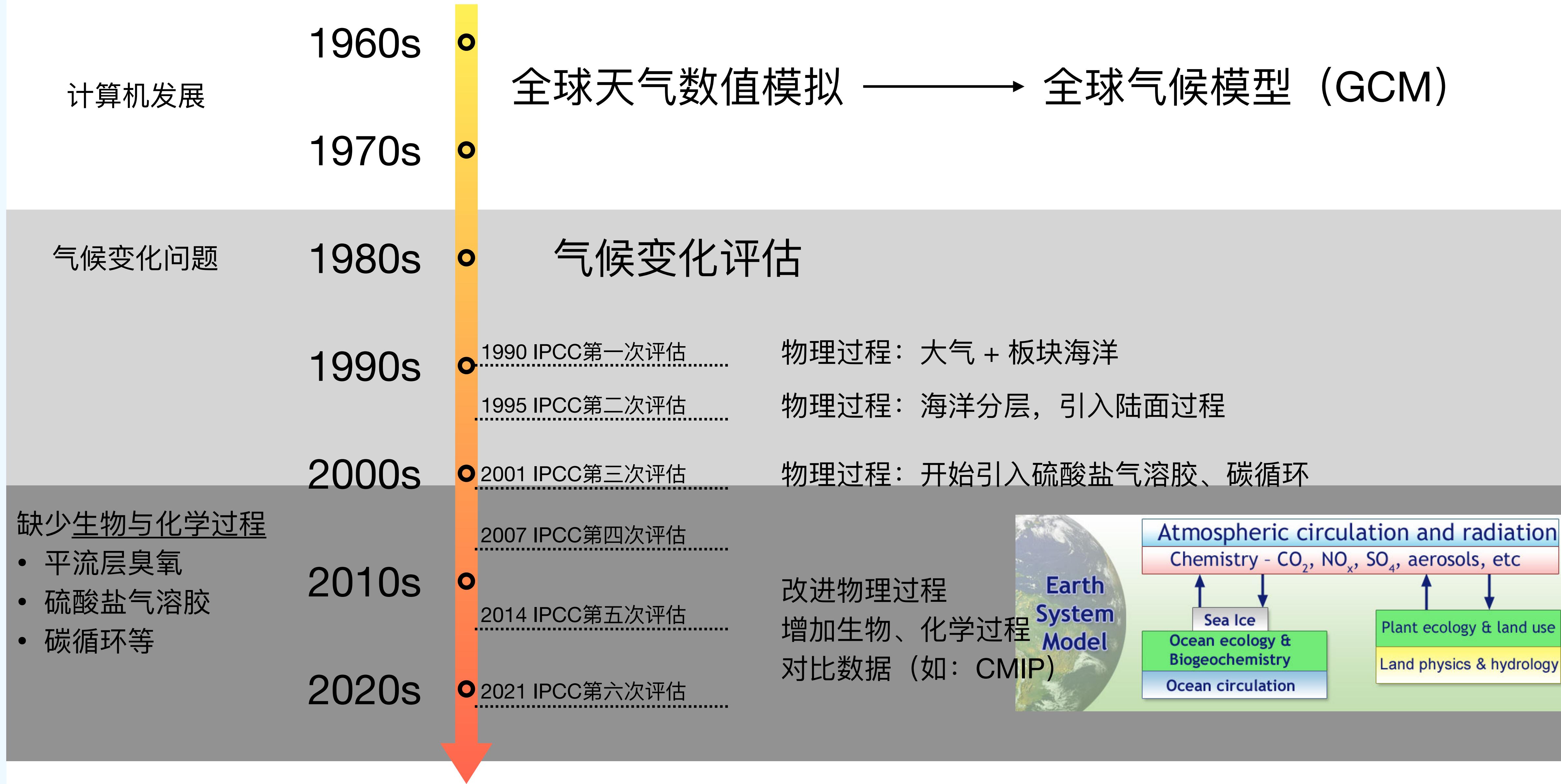
植被——“不安分”的大气边界层

中国科学技术大学 王玉杰

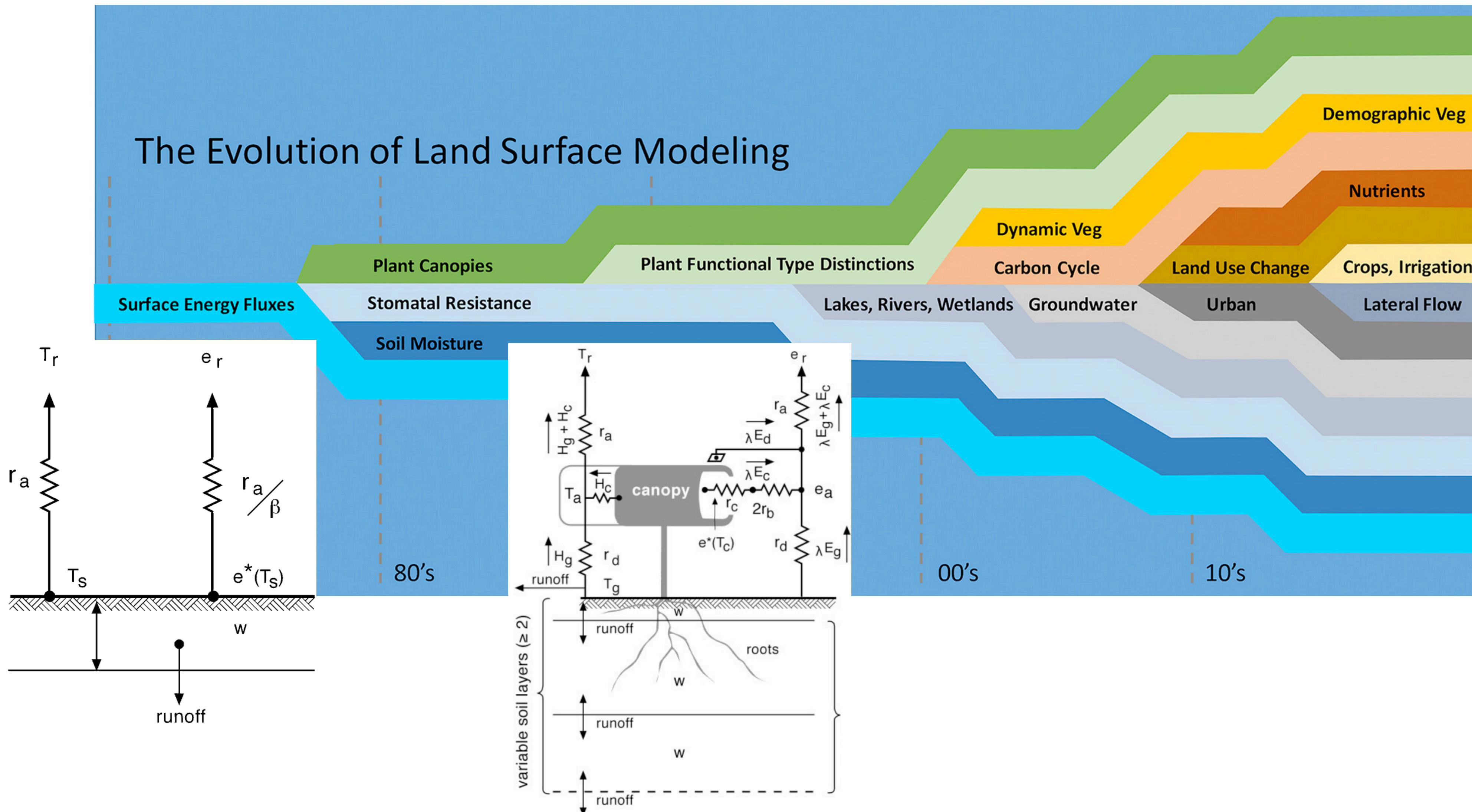
个人经历



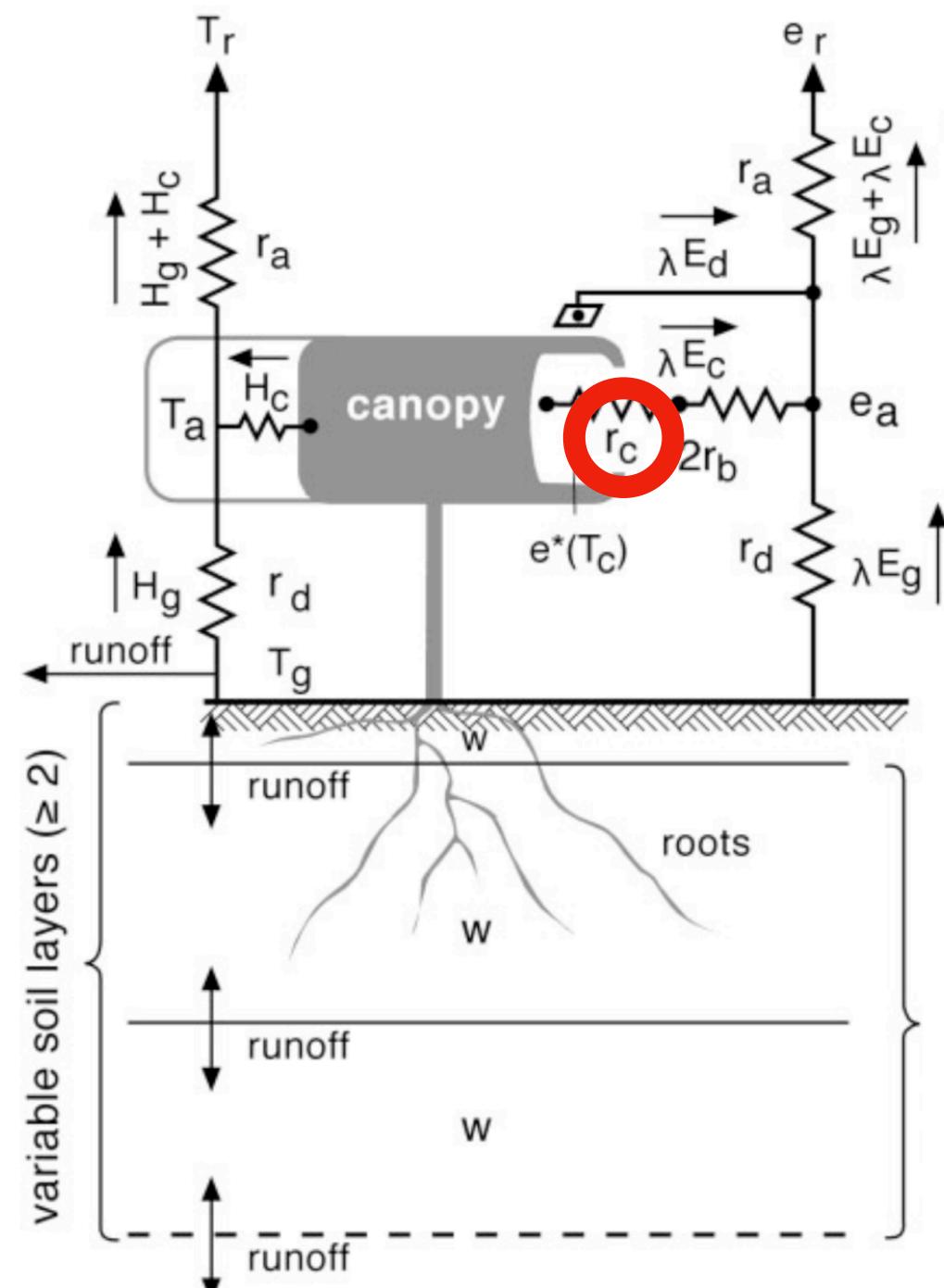
大气科学与全球变化



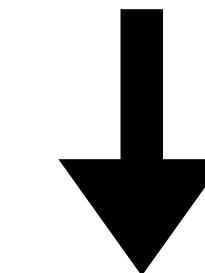
“不安分”的边界层



“不安分”的边界层

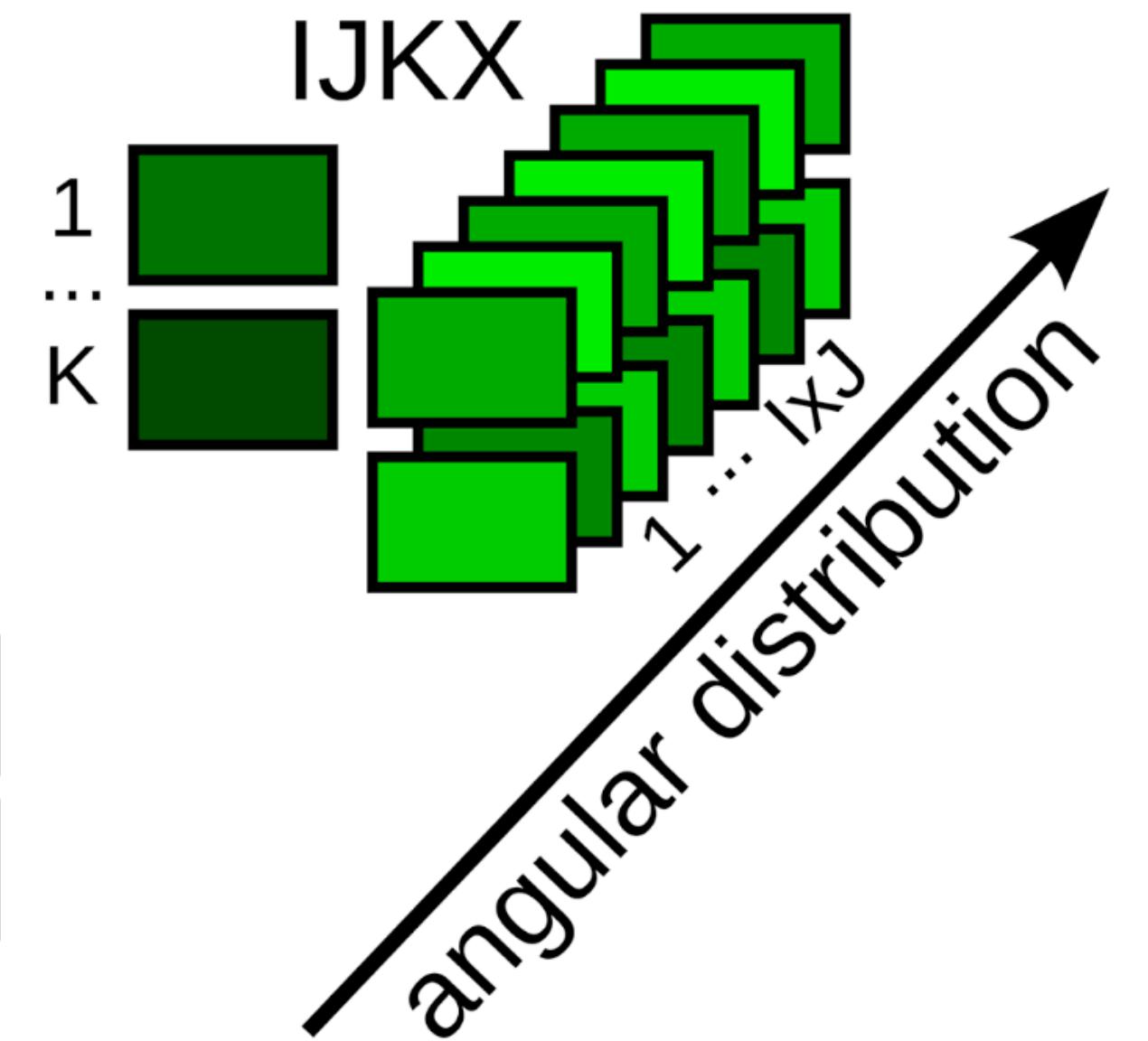
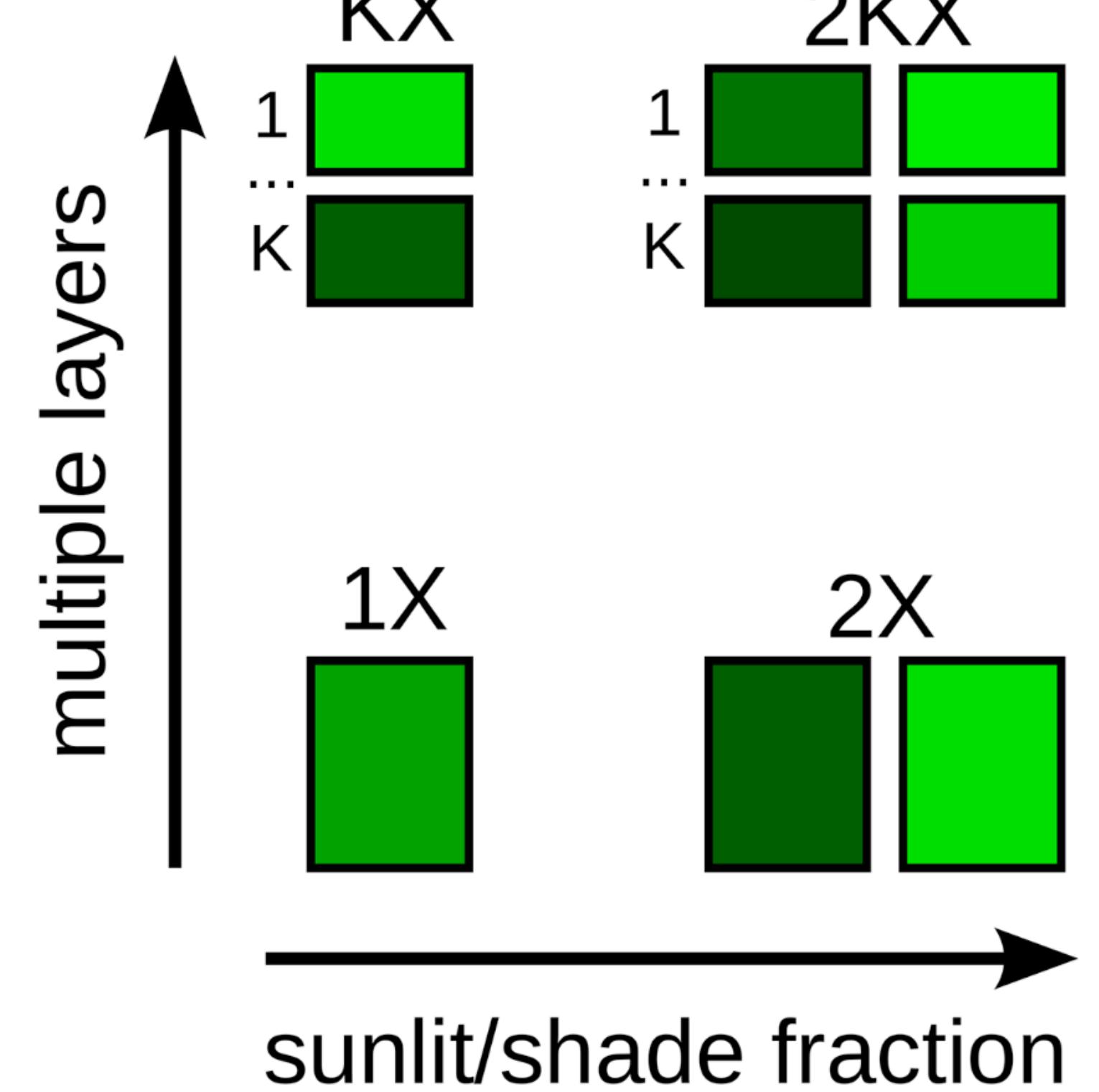
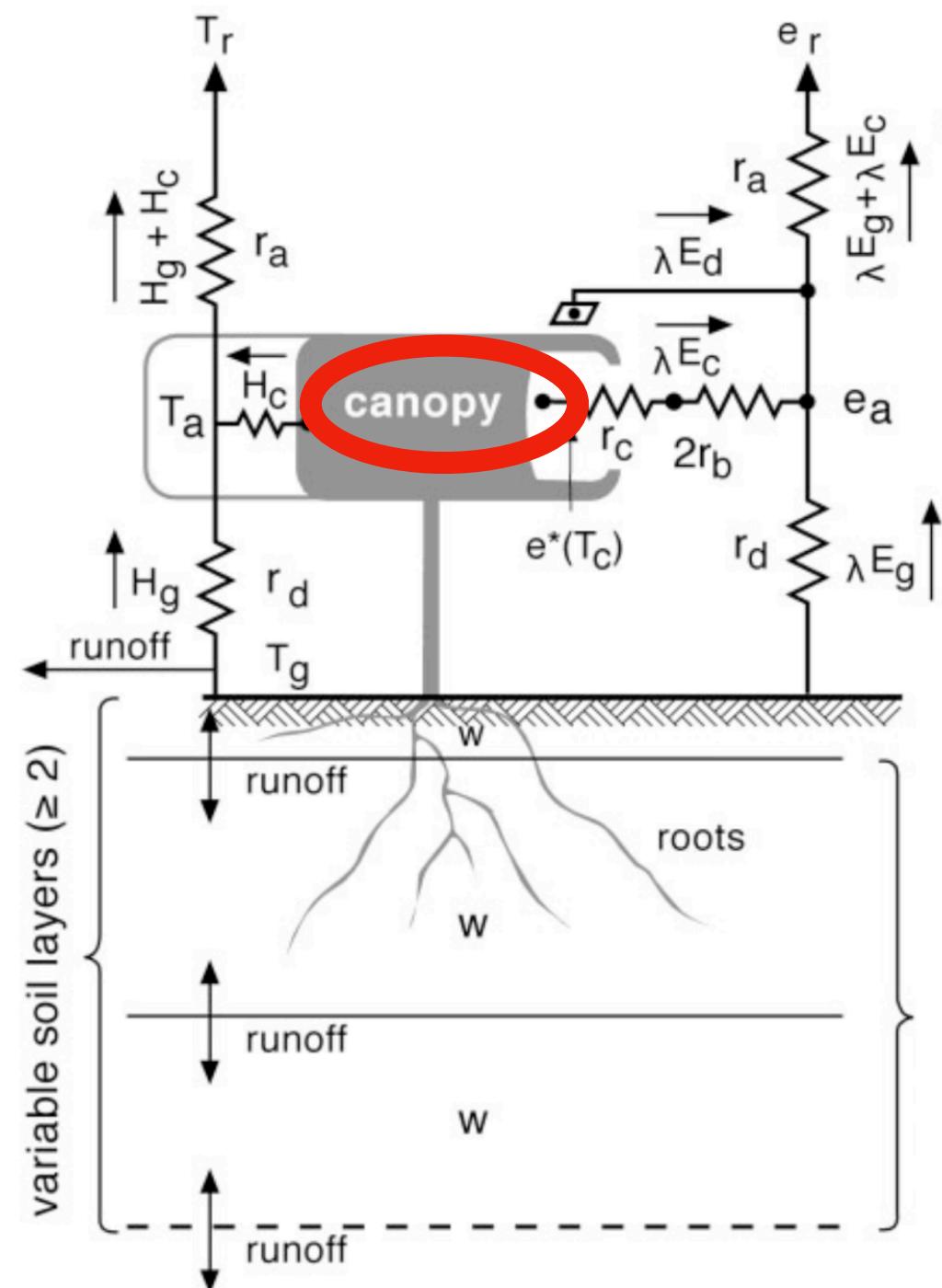


$$g_s = g_0 + g_1 \cdot RH \cdot \frac{A}{C_a} \cdot \beta$$



Model	Reference	Water penalty (Θ or Θ')	Marginal penalty ($\partial\Theta/\partial E$ or $\partial\Theta'/\partial E$)
Cowan-Farquhar	Cowan & Farquhar (1977)	$\Theta = \frac{E_{leaf}}{\lambda}$	$\frac{\partial\Theta}{\partial E} = \frac{1}{\lambda}$
Mäkelä et al.	(1996)	$\Theta = \frac{E_{leaf}}{\lambda'(t)}$	$\frac{\partial\Theta}{\partial E} = \frac{1}{\lambda'(t)}$
Manzoni	Manzoni et al. (2013)	$\Theta = \frac{E_{leaf}}{\Lambda}$	$\frac{\partial\Theta}{\partial E} = \frac{1}{\Lambda}$
Prentice	Prentice et al. (2014)	$\Theta = A \left(1 - \frac{1}{c_E E_{leaf} + c_V V_{cmax}} \right)$	$\frac{\partial\Theta}{\partial E} = \frac{A}{E_{leaf} + (c_V/c_E)V_{cmax}}$
Lu	Lu et al. (2016)	$\Theta = \frac{E_{leaf}}{\lambda}$	$\frac{\partial\Theta}{\partial E} = \frac{1}{\lambda}$
Wolf-Anderegg-Pacala	Wolf et al. (2016), Anderegg et al. (2018)	$\Theta = aP^2 + bP + c$	$\frac{\partial\Theta}{\partial E} = \frac{2aP+b}{K}$
Sperry	Sperry et al. (2017)	$\Theta = A_{max} \left(1 - \frac{K}{K_{max}} \right)$	$\frac{\partial\Theta}{\partial E} = - \frac{\partial K}{\partial E} \frac{A_{max}}{K_{max}}$
Eller	Eller et al. (2018)	$\Theta = A \left(1 - \frac{K}{K_{max,0}} \right)$	$\frac{\partial\Theta}{\partial E} = - \frac{\partial K}{\partial E} \frac{A}{K}$
Hölttä	Hölttä et al. (2017)	$\Theta' = A_{ww} \frac{SC}{SC_{max}}$	$\frac{\partial\Theta'}{\partial E} = \frac{A}{SC_{max} - SC} \frac{\partial SC}{\partial E}$
Dewar CAP	Dewar et al. (2018)	$\Theta' = A_{ww} \frac{P}{P_{crit}}$	$\frac{\partial\Theta'}{\partial E} = \frac{A}{K(P_{crit} - P)}$
New model		$\Theta = A \frac{E_{leaf}}{E_{crit}}$	$\frac{\partial\Theta}{\partial E} = \frac{A}{E_{crit} - E_{leaf}}$

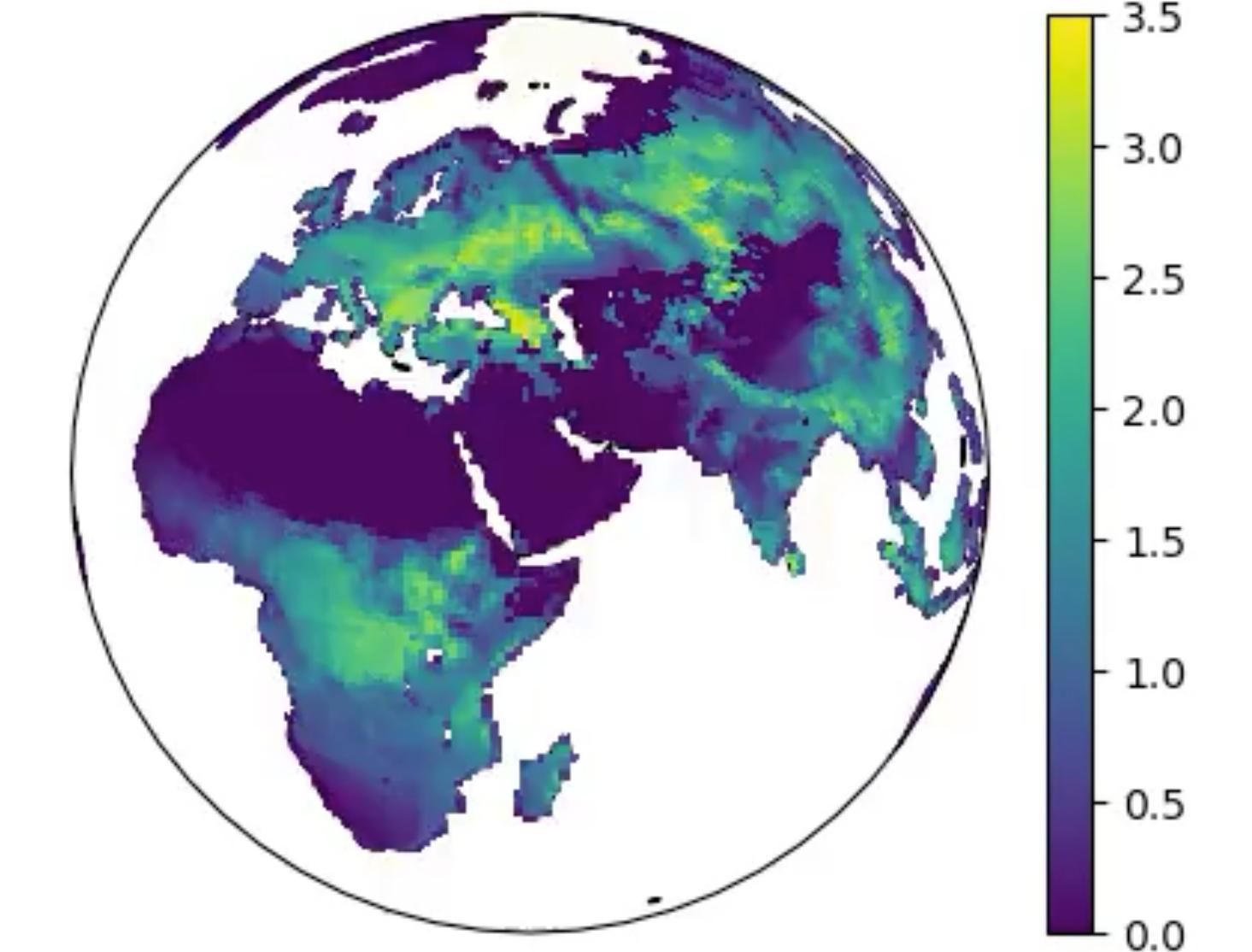
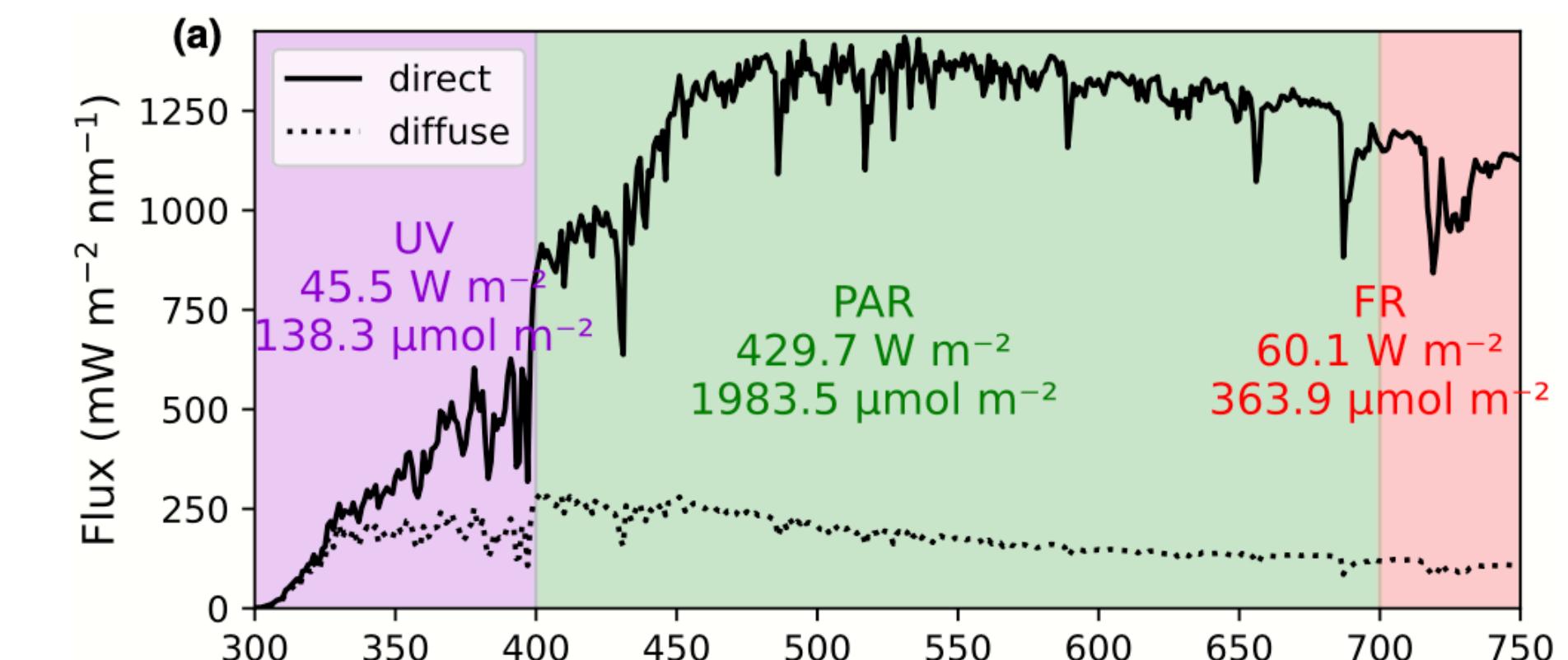
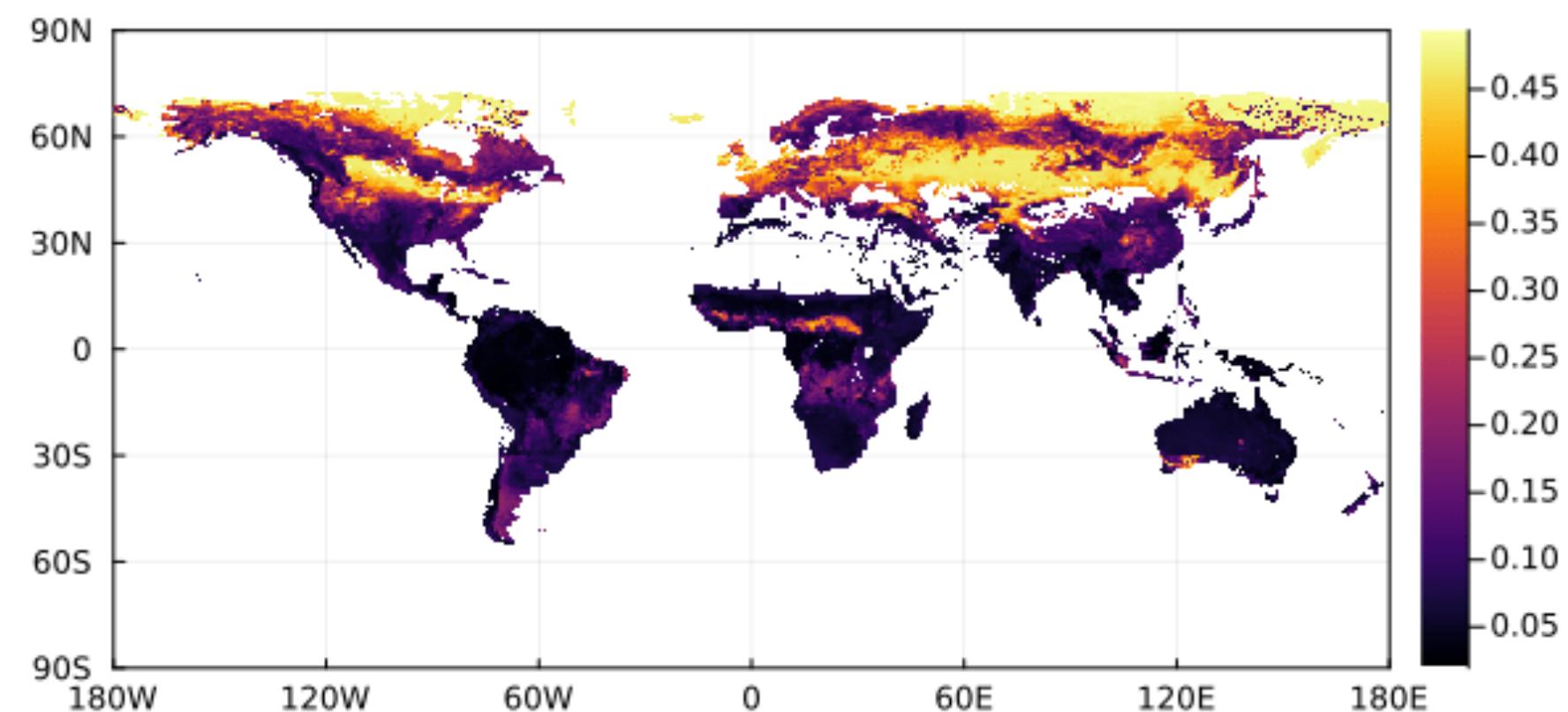
“不安分”的边界层



“不安分”的边界层



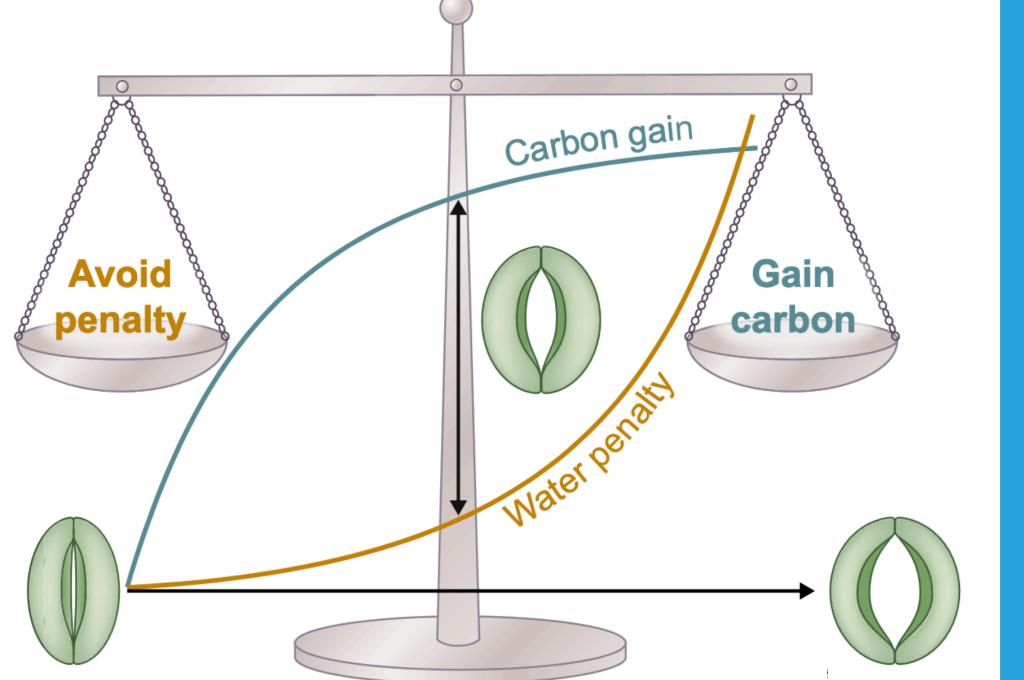
Plant Functional Type	χ_L	α_{vis}^{leaf}	α_{nir}^{leaf}	α_{vis}^{stem}	α_{nir}^{stem}	τ_{vis}^{leaf}	τ_{nir}^{leaf}
NET Temperate	0.01	0.07	0.35	0.16	0.39	0.05	0.10
NET Boreal	0.01	0.07	0.35	0.16	0.39	0.05	0.10
NDT Boreal	0.01	0.07	0.35	0.16	0.39	0.05	0.10
BET Tropical	0.10	0.10	0.45	0.16	0.39	0.05	0.25
BET temperate	0.10	0.10	0.45	0.16	0.39	0.05	0.25
BDT tropical	0.01	0.10	0.45	0.16	0.39	0.05	0.25
BDT temperate	0.25	0.10	0.45	0.16	0.39	0.05	0.25
BDT boreal	0.25	0.10	0.45	0.16	0.39	0.05	0.25



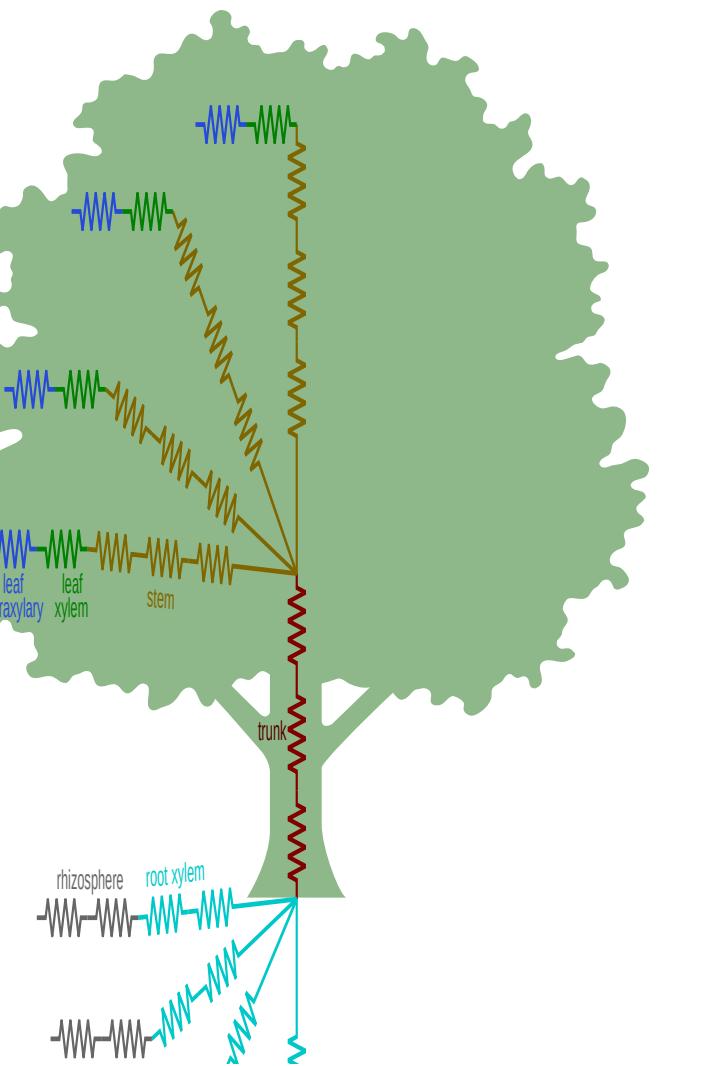
研究方向



植物生理生态



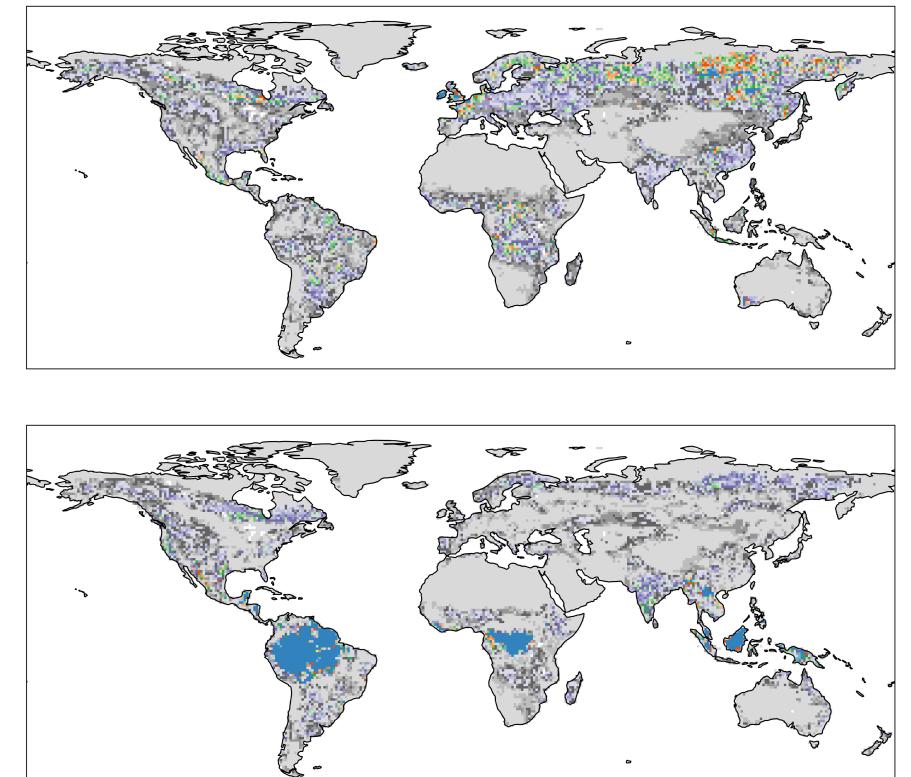
植被模型



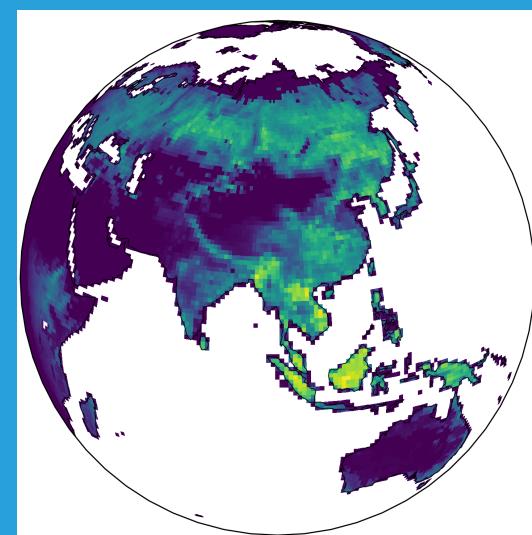
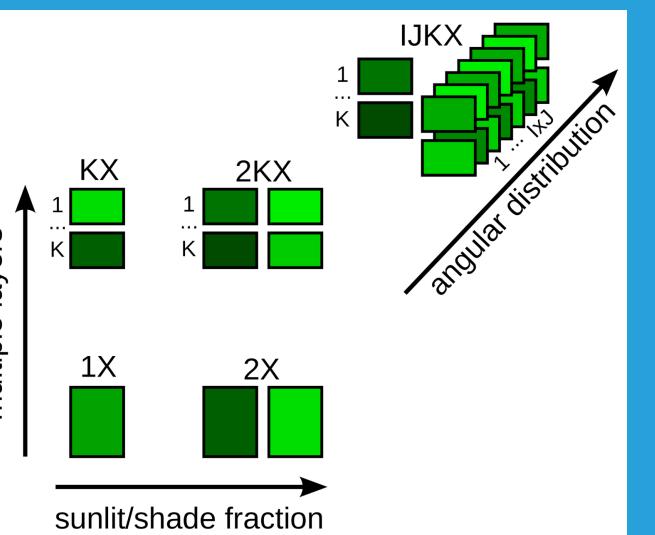
地球系统模式



气候变化应对



Model	Reference	Water penalty (Θ or Θ')	Marginal penalty ($\partial\Theta/\partial E$ or $\partial\Theta'/\partial E$)
Cowan-Farquhar	Cowan & Farquhar (1977)	$\Theta = \frac{E_{ref}}{E}$	$\frac{\partial\Theta}{\partial E} = \frac{1}{\lambda}$
Mäkelä	Mäkelä et al. (1996)	$\Theta = \frac{E_{ref}}{E(t)}$	$\frac{\partial\Theta}{\partial E} = \frac{1}{\lambda(t)}$
Manzoni	Manzoni et al. (2013)	$\Theta = \frac{E_{ref}}{\Lambda}$	$\frac{\partial\Theta}{\partial E} = \frac{1}{\Lambda}$
Prentice	Prentice et al. (2014)	$\Theta = A \left(1 - \frac{1}{c_E E_{ref} + c_V V_{max}}\right)$	$\frac{\partial\Theta}{\partial E} = \frac{A}{E_{ref} + (c_V/c_E)V_{max}}$
Lu	Lu et al. (2016)	$\Theta = \frac{E_{ref}}{\lambda}$	$\frac{\partial\Theta}{\partial E} = \frac{2\theta+1}{\lambda}$
Wolf-Anderegg-Pacala	Wolf et al. (2016), Anderegg et al. (2018)	$\Theta = aP^2 + bP + c$	$\frac{\partial\Theta}{\partial E} = \frac{2aP+b}{K}$
Sperry	Sperry et al. (2017)	$\Theta = A_{max} \left(1 - \frac{K}{K_{max}}\right)$	$\frac{\partial\Theta}{\partial E} = -\frac{\partial K}{\partial E} \frac{A_{max}}{K_{max}}$
Eller	Eller et al. (2018)	$\Theta = A \left(1 - \frac{K}{K_{max}}\right)$	$\frac{\partial\Theta}{\partial E} = -\frac{\partial K}{\partial E} \frac{A}{K_{max}}$
Hölttä	Hölttä et al. (2017)	$\Theta' = A_{ww} \frac{SC}{SC_{max}}$	$\frac{\partial\Theta'}{\partial E} = \frac{A}{SC_{max} - SC} \frac{\partial SC}{\partial E}$
Dewar CAP	Dewar et al. (2018)	$\Theta' = A_{ww} \frac{P}{P_{ref}}$	$\frac{\partial\Theta'}{\partial E} = \frac{A}{K(P_{ref} - P)}$
New model		$\Theta = A \frac{E_{ref}}{E}$	$\frac{\partial\Theta}{\partial E} = \frac{A}{E_{ref} - E}$





9

大气**海洋**

气溶胶与大气化学

全球水循环

极端天气

云与对流

辐射传输

陆气交互

人类活动

植被过程

植被动态

土壤水文

陆地生物化学

陆地**冰层**

涛动/厄尔尼诺

海岸过程与海浪

洋流与旋涡

盐分与生物化学

混合层过程

深海环流

海冰

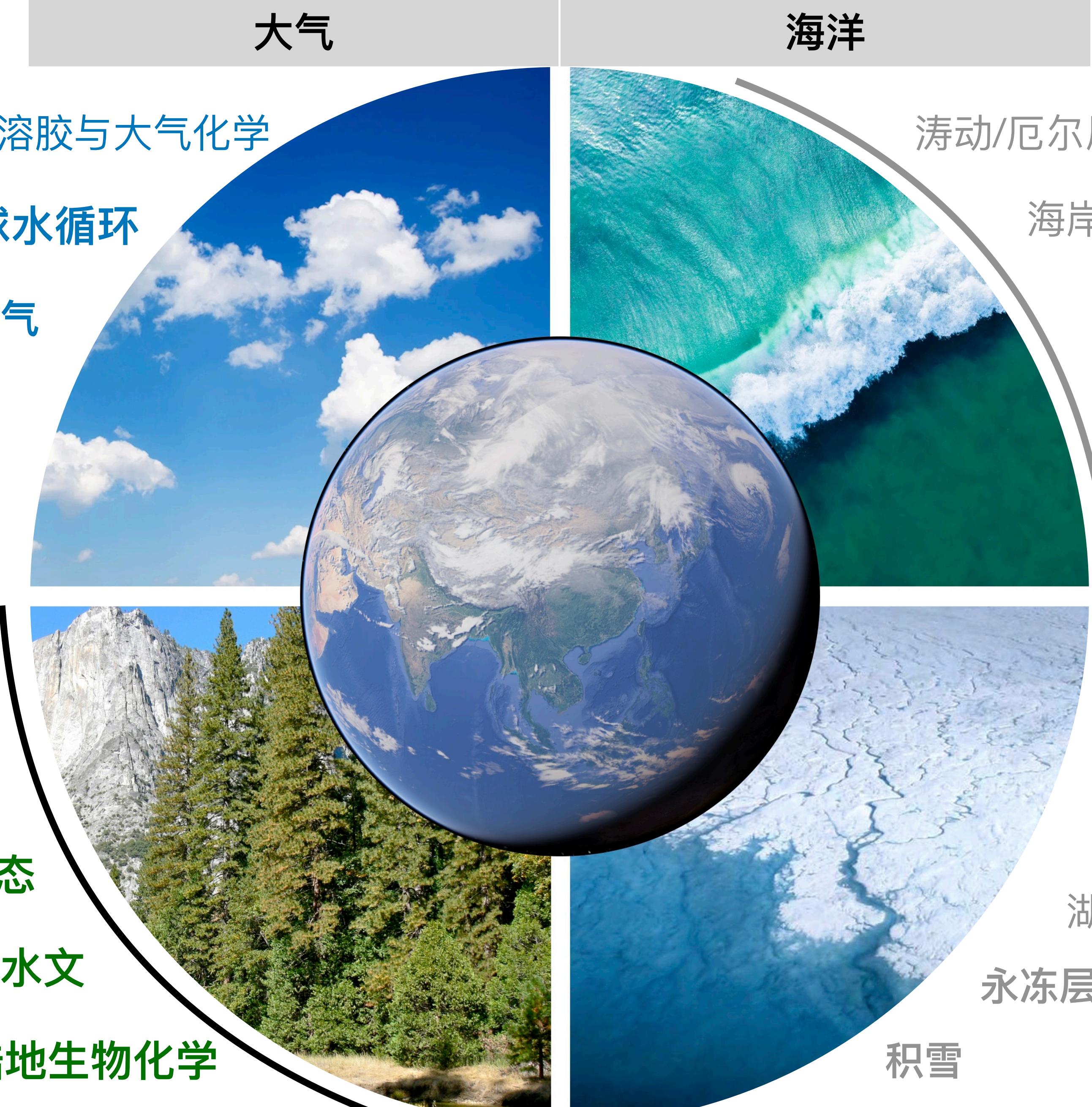
融化通道与冰架

冰盖与冰川

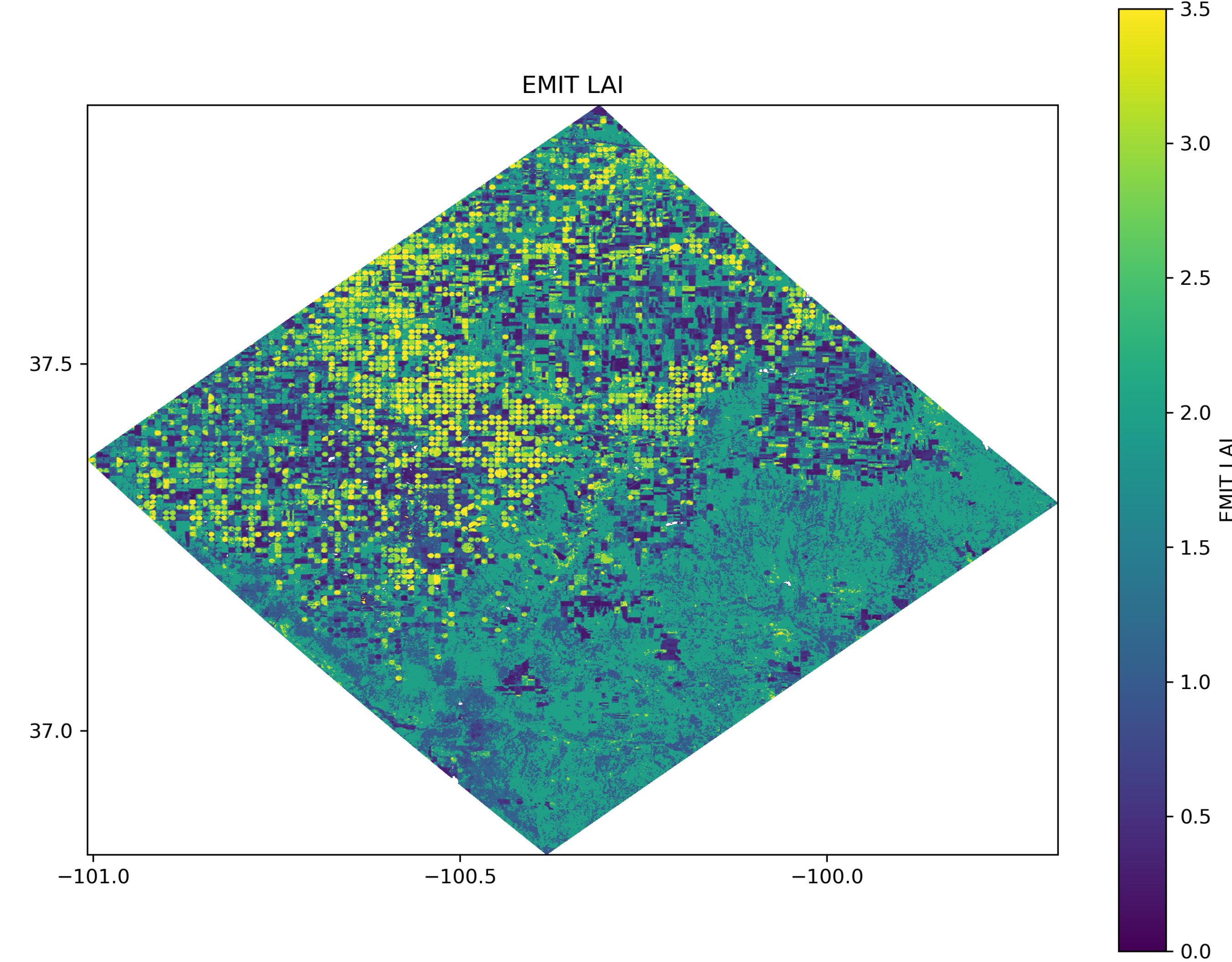
湖冰与河冰

永冻层

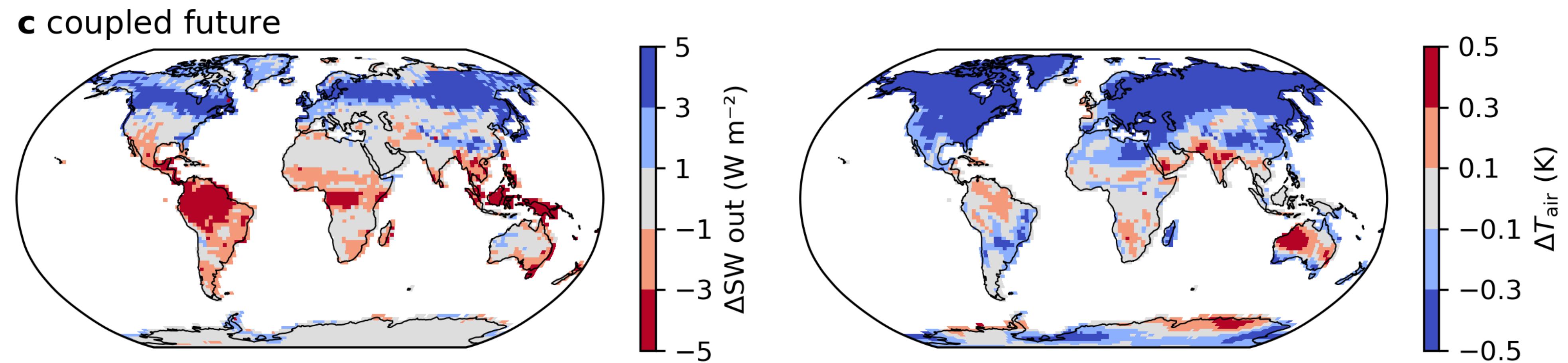
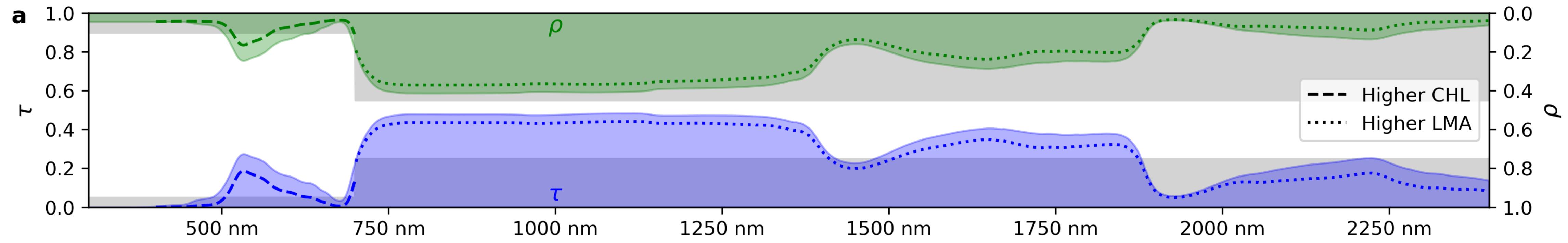
积雪



植被遥感

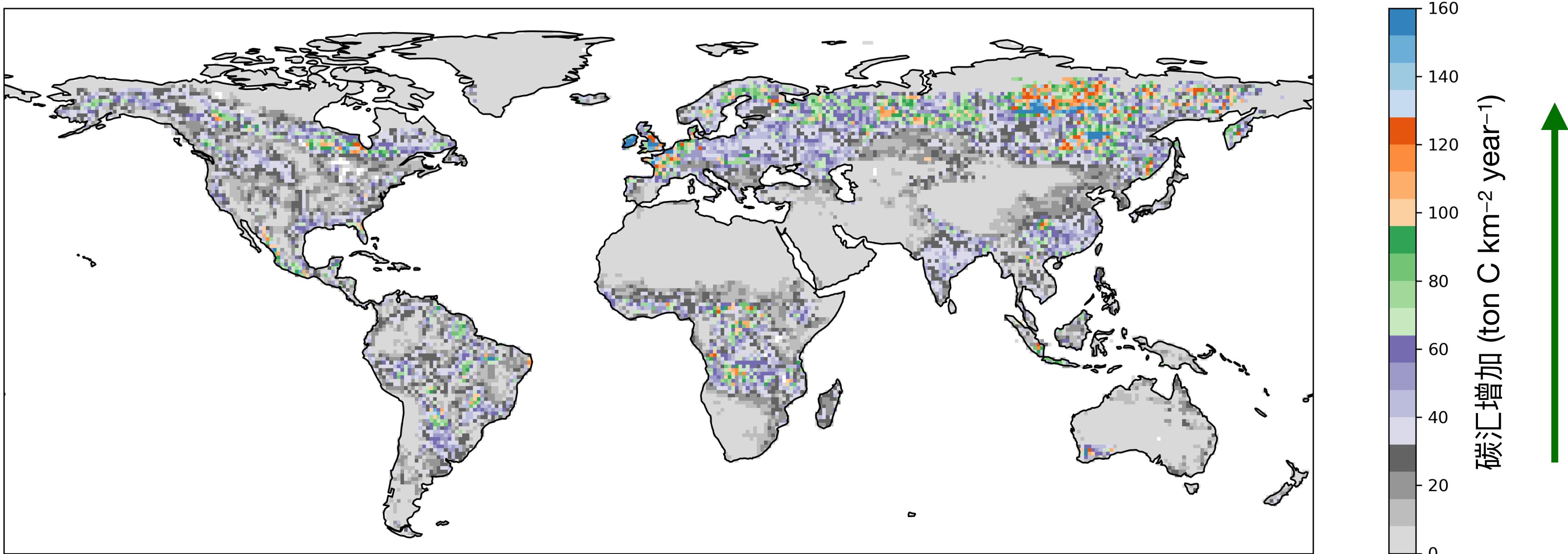


改进未来气候预测

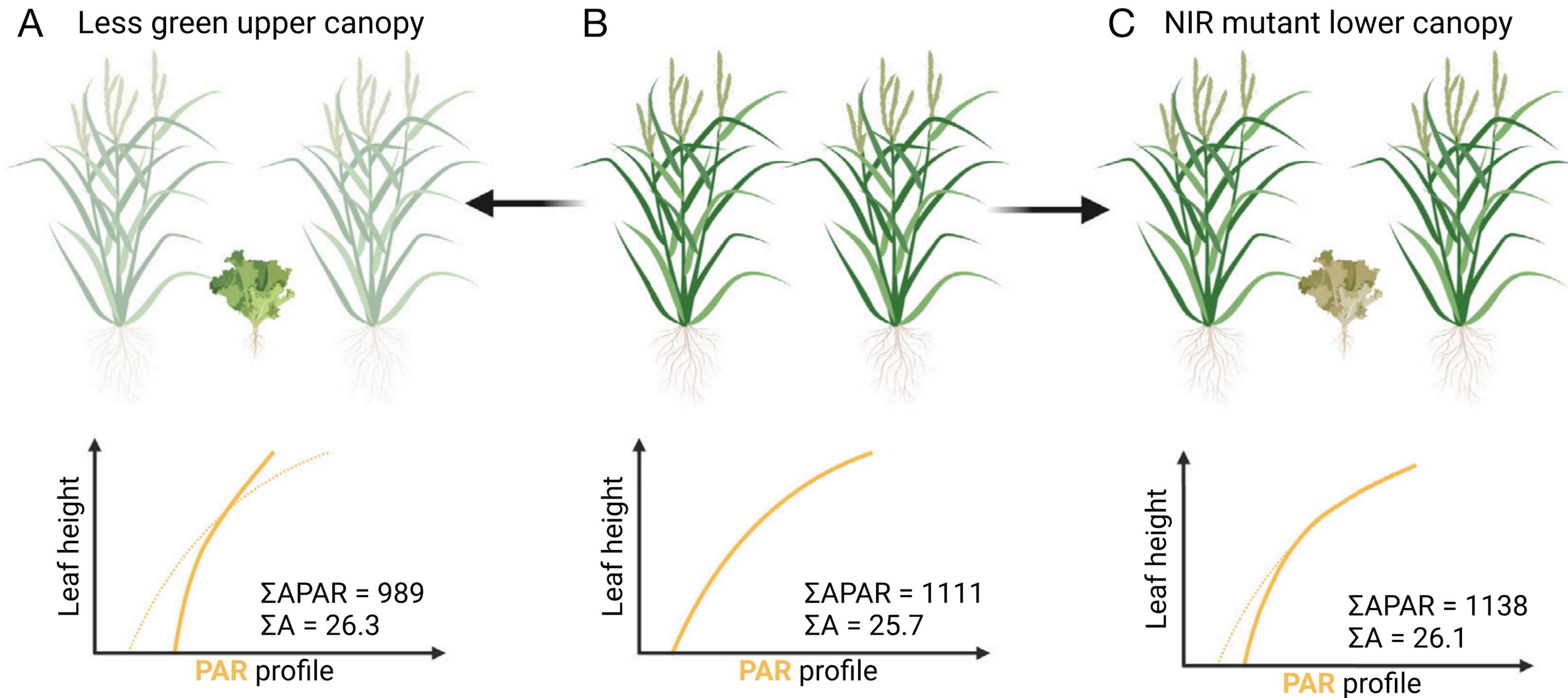


气候变化应对方案

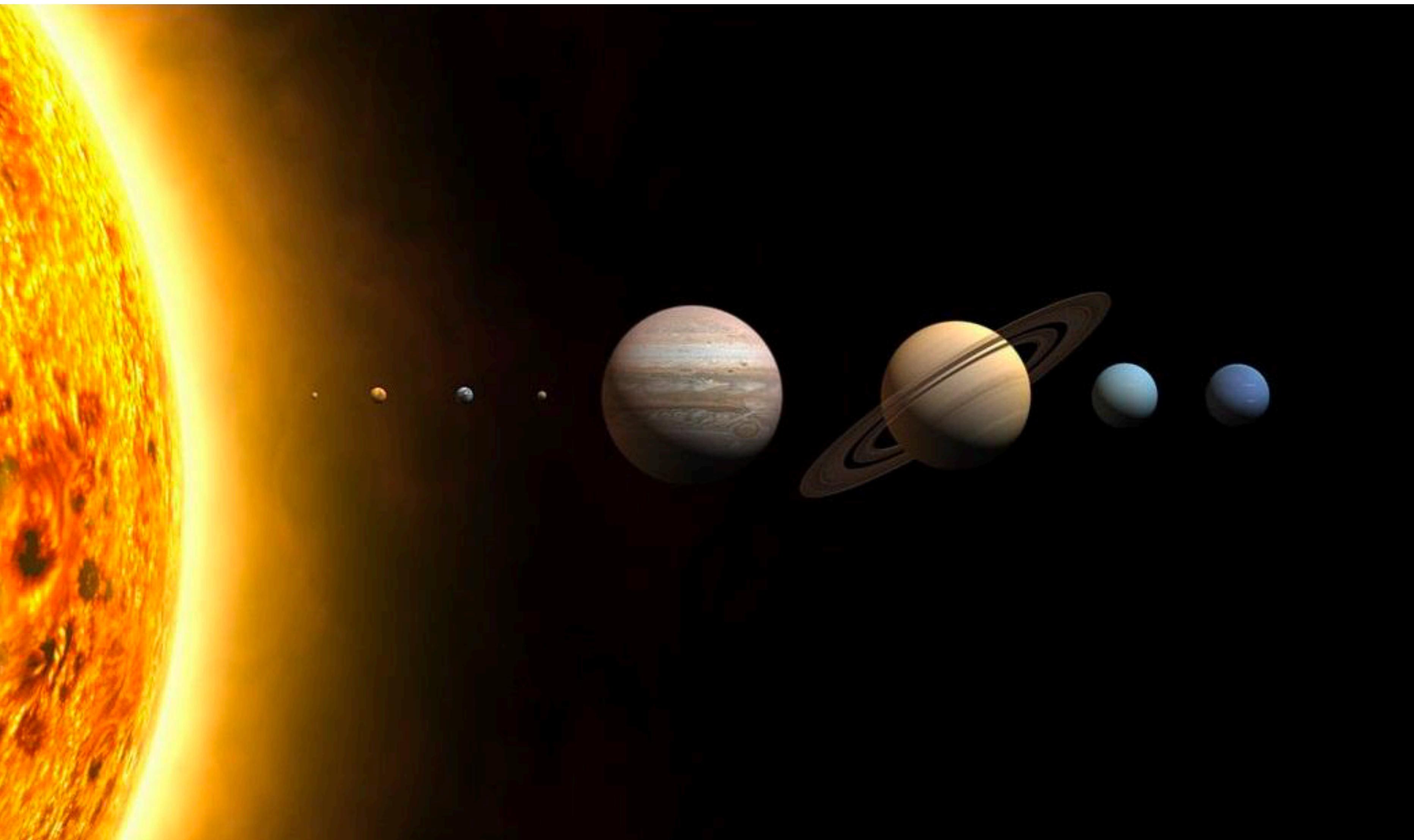
改变叶绿素含量以增加陆地碳汇的潜力



结合作物育种



“殖民”也以食为天



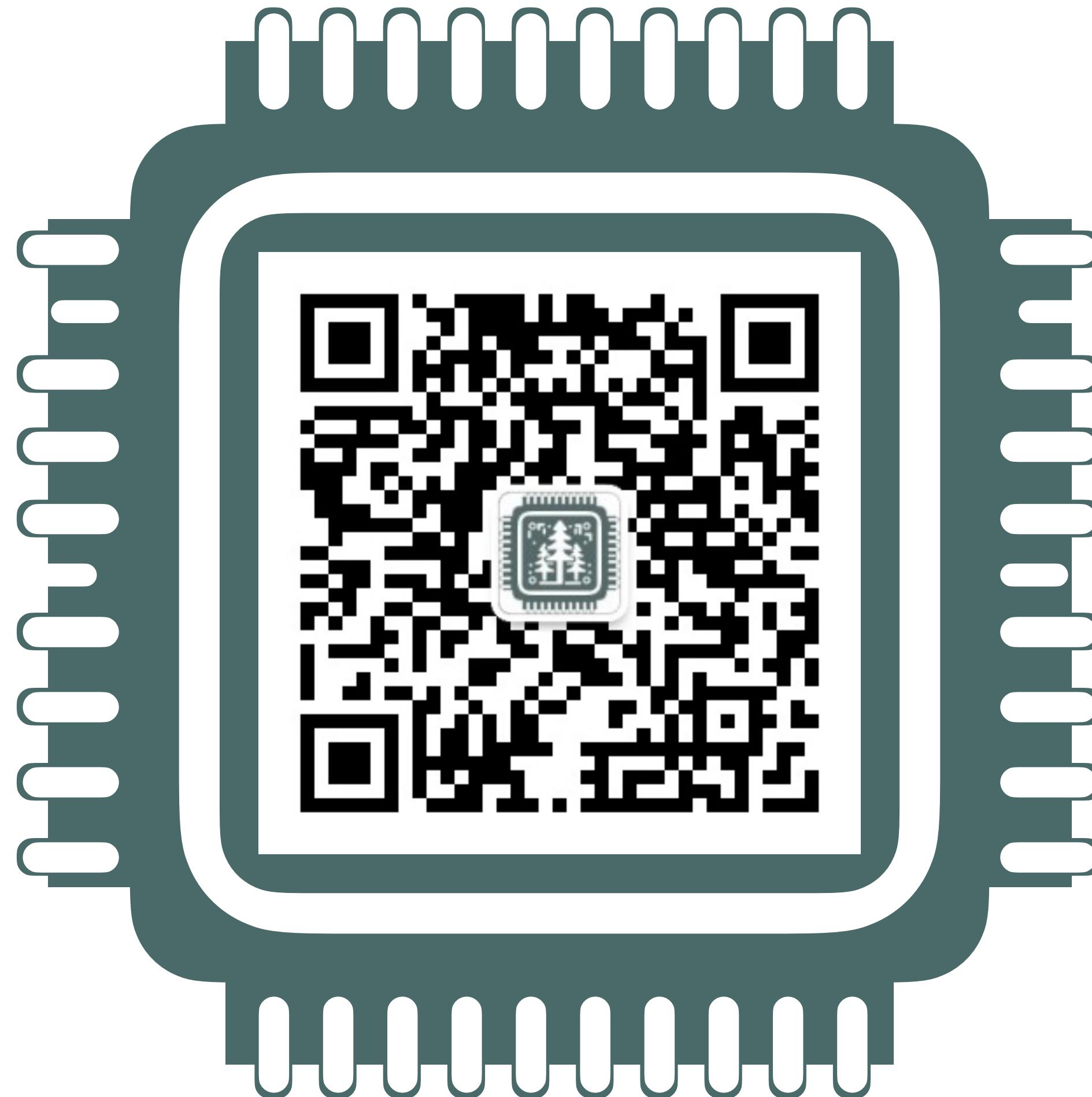
Emerald实验室

silicormosia.github.io

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- 博士研究生
- 博士后
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新一代模式研发

- 植物生理生态
- 科学软硬件开发
- 植被模型
- 地球系统模式
- 全球变化
- 数据库开发管理