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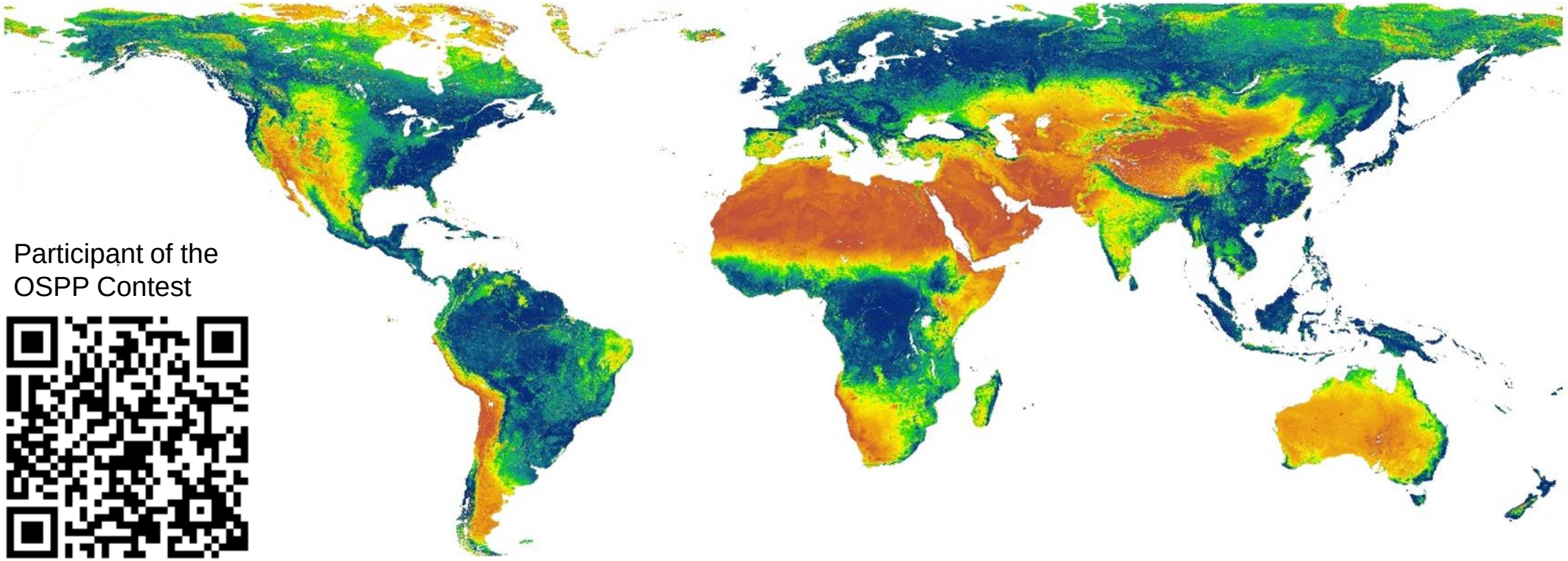
EGU General Assembly 2022

EGU Division Hydrological Sciences

Mapping ecological and human systems responses to land-atmosphere interactions altered by climate change

Yannick Back, Peter M. Bach, Alrun Jasper-Tönnies, Wolfgang Rauch and Manfred Kleidorfer



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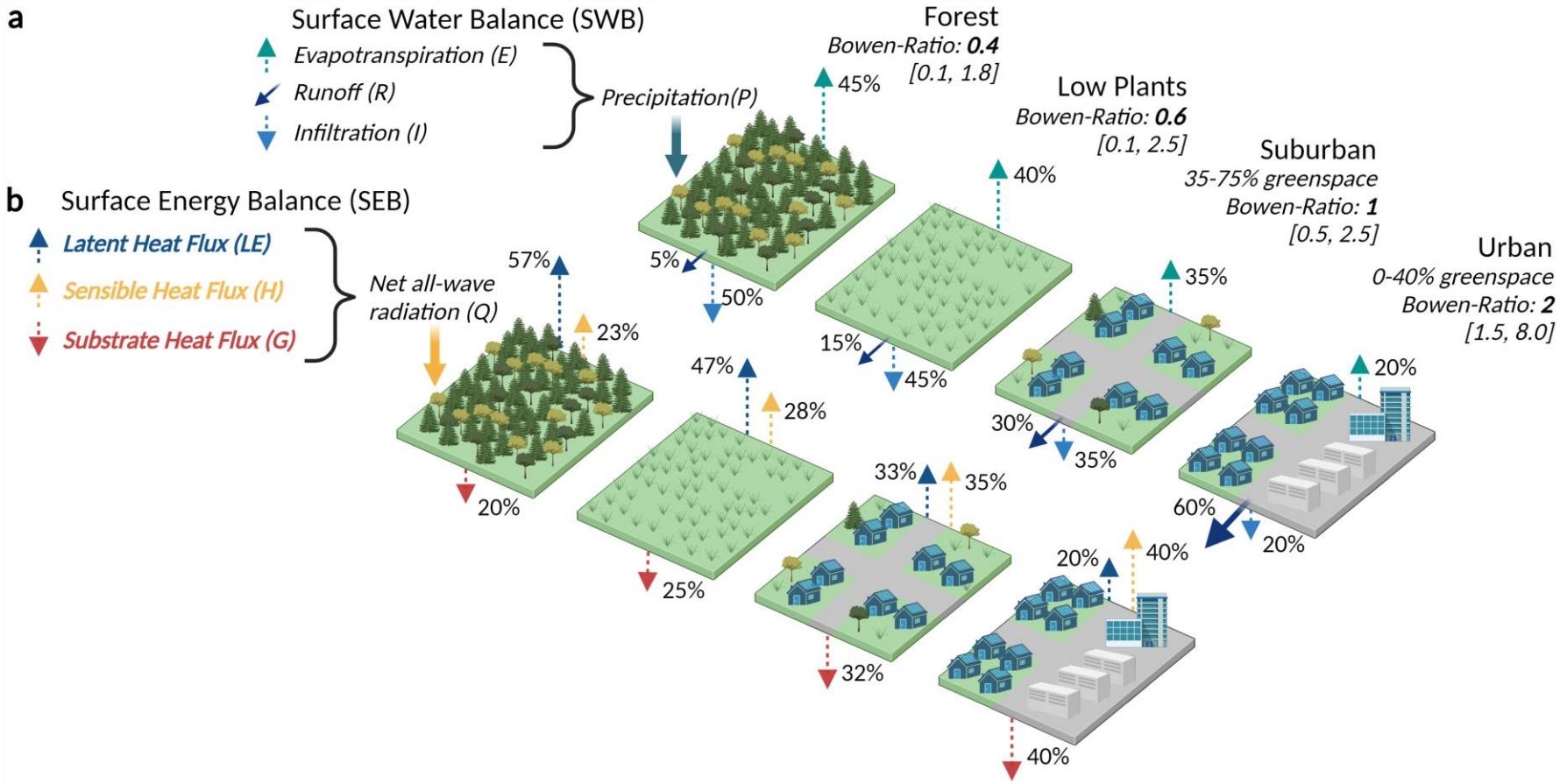

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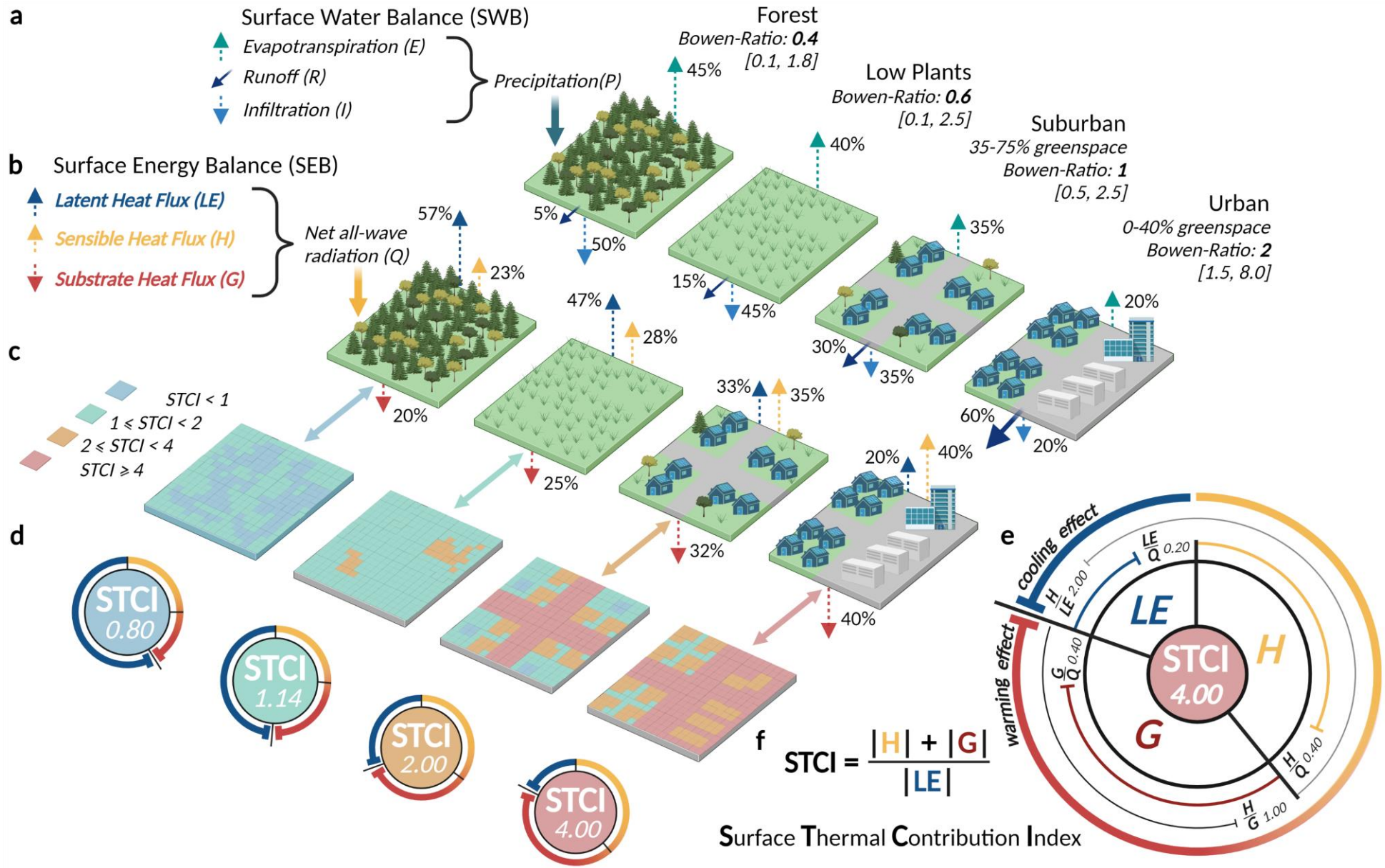

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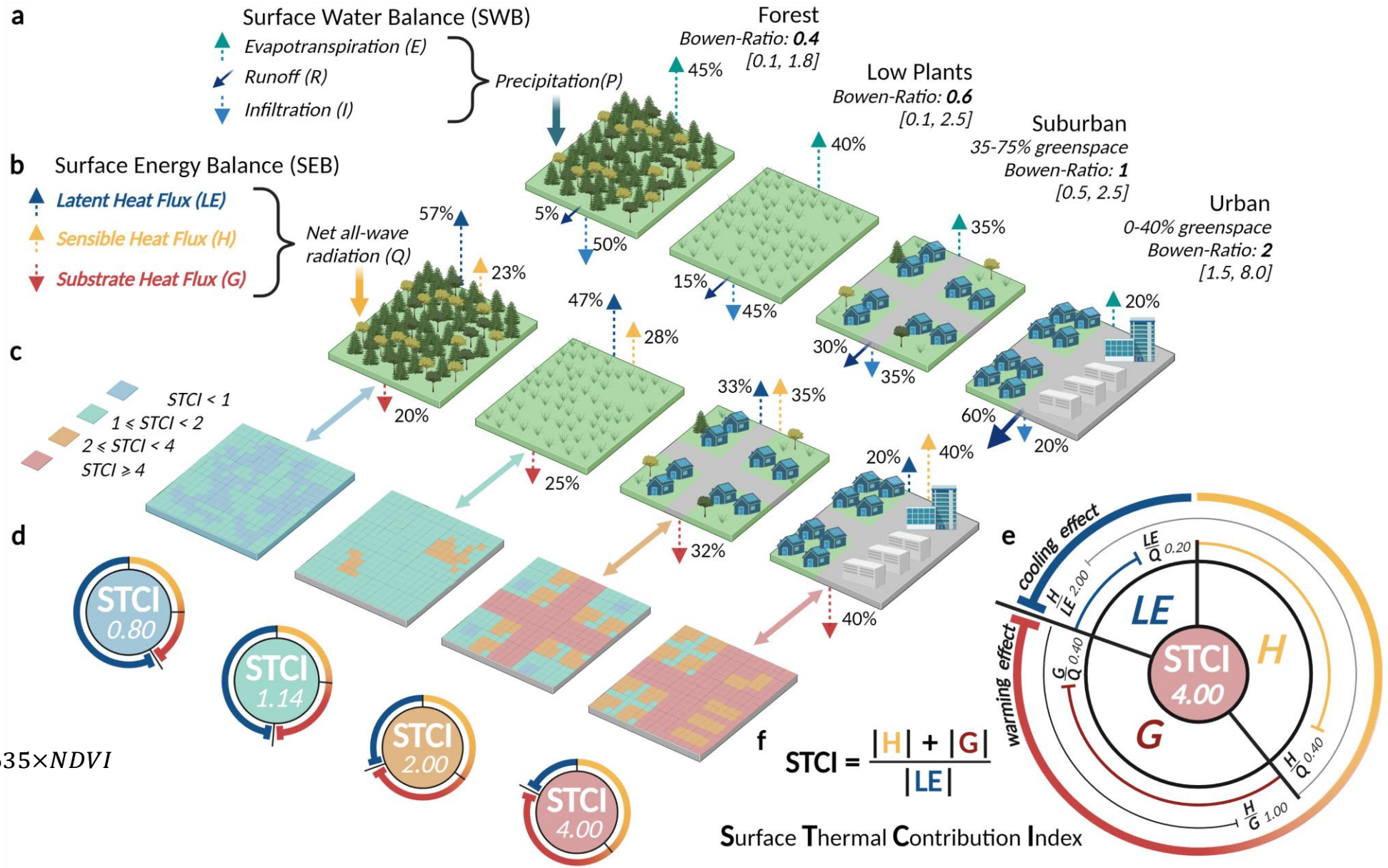

$$STCI = 3.0983 \times e^{-3.635 \times NDVI}$$

$$R^2 = 0.991$$

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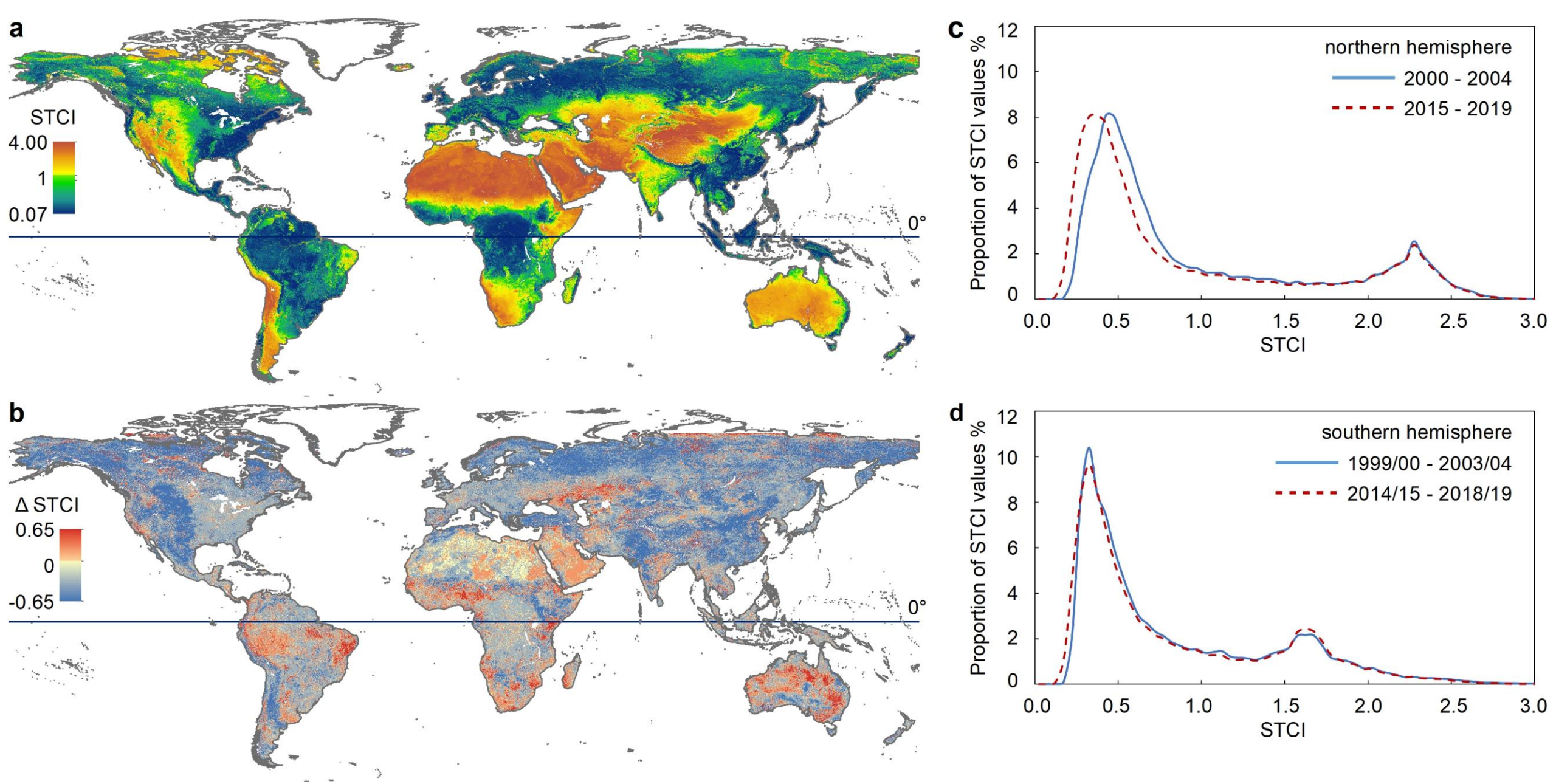
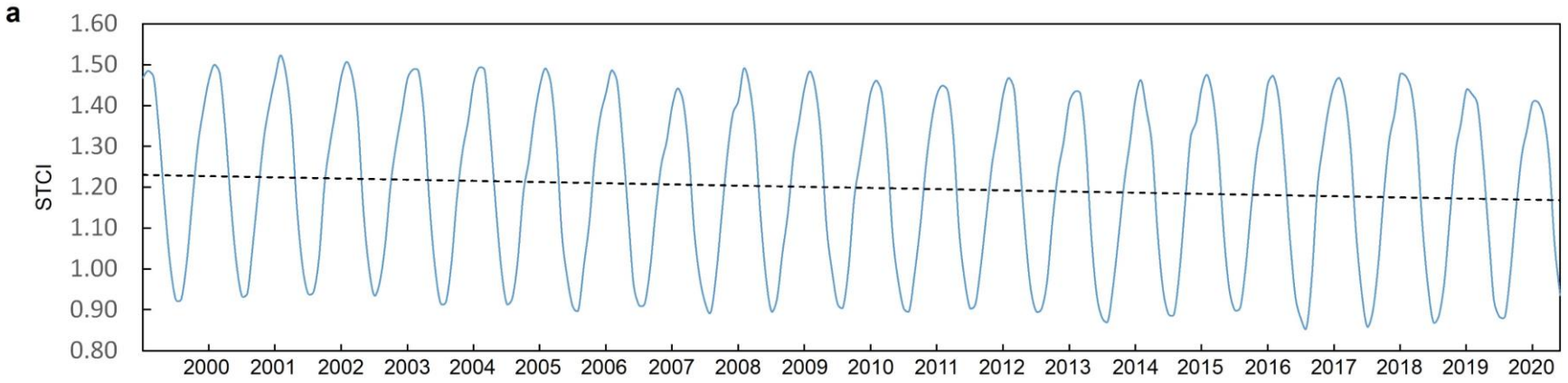
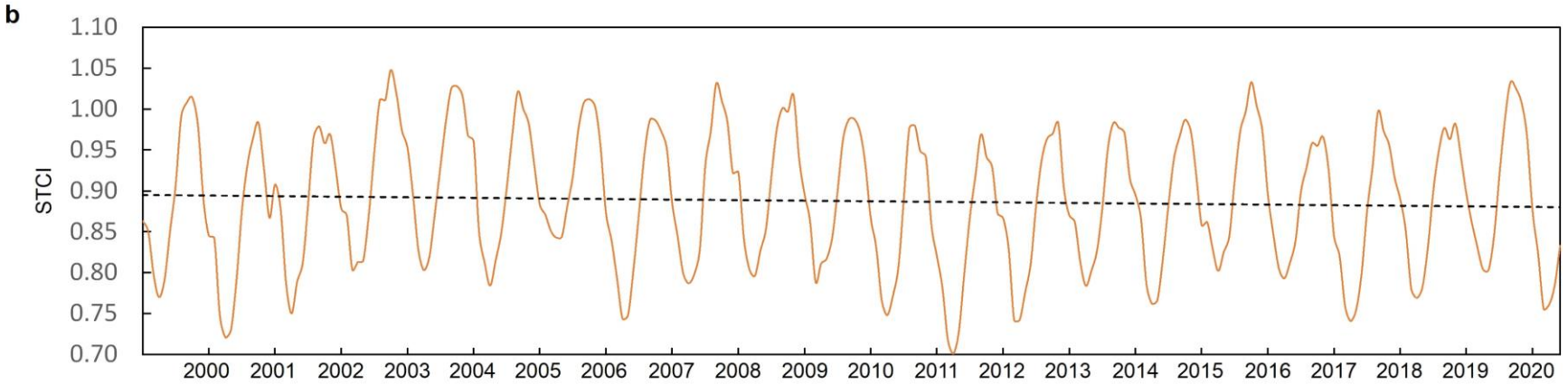

a
STCI
4.00
1
0.07
0°
b
Δ STCI
0.65
0
-0.65
0°
c
northern hemisphere
2000 - 2004
2015 - 2019
Proportion of STCI values %
STCI
d
southern hemisphere
1999/00 - 2003/04
2014/15 - 2018/19
Proportion of STCI values %
STCI

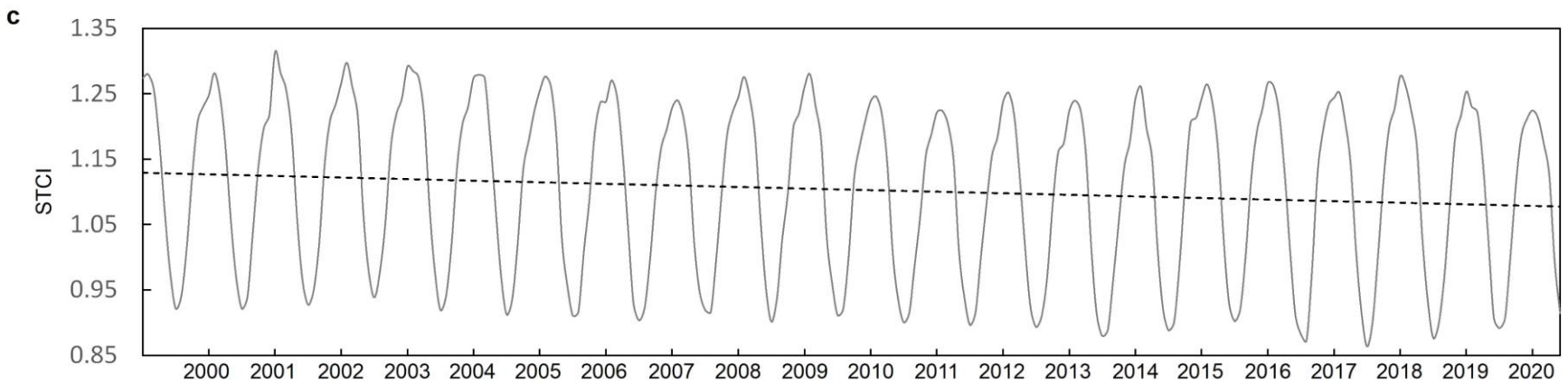
Northern Hemisphere

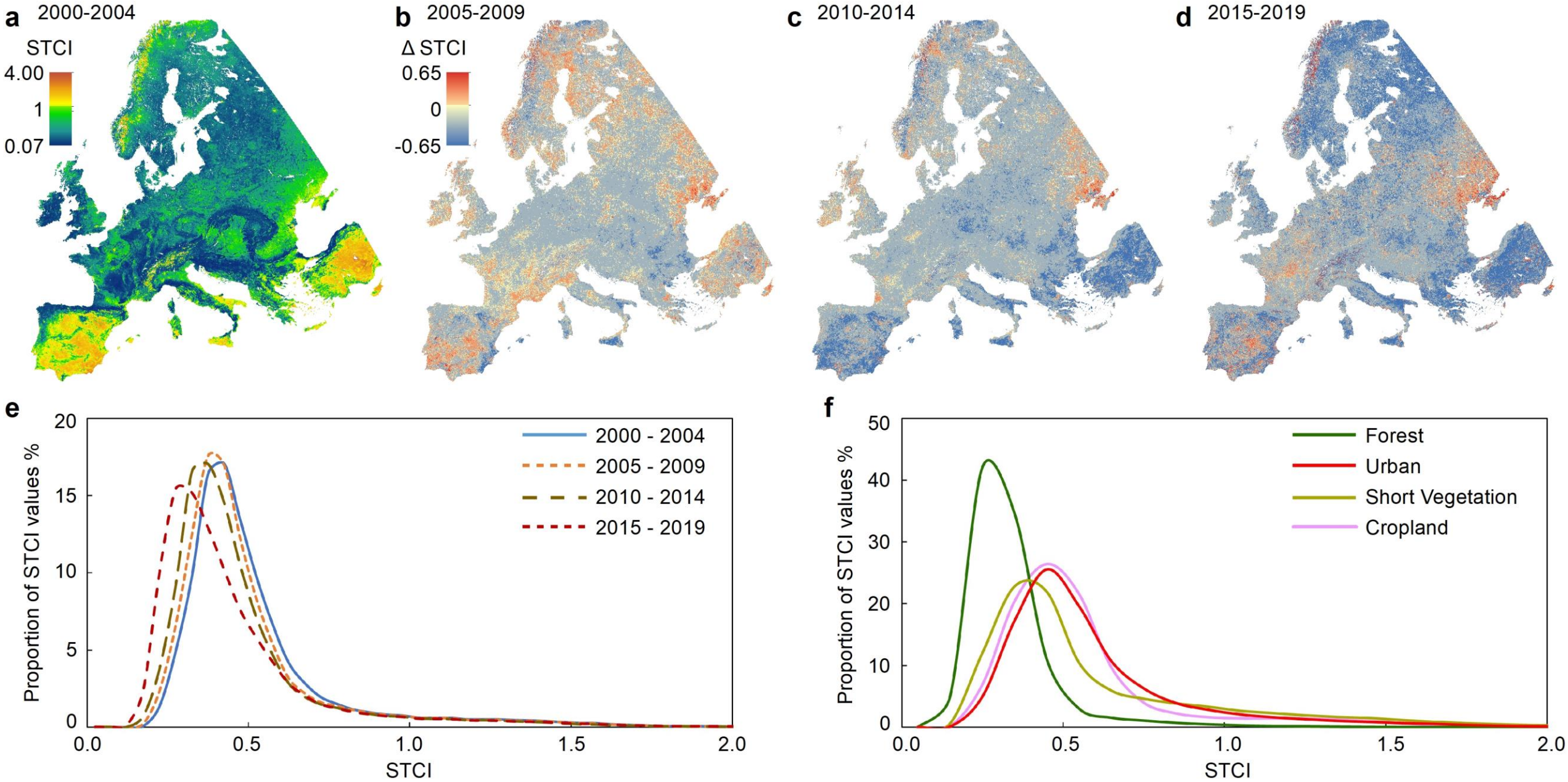


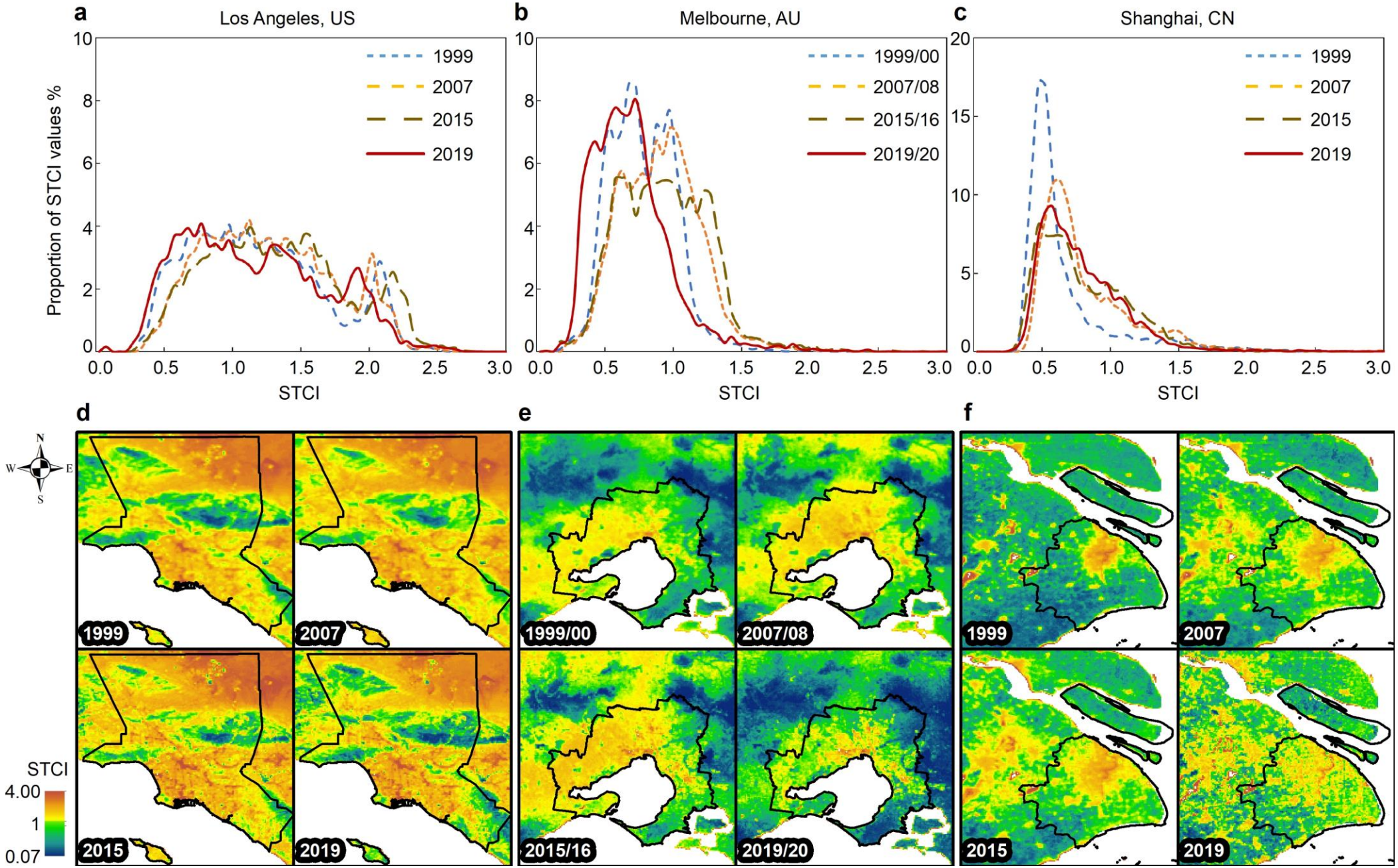
Southern Hemisphere

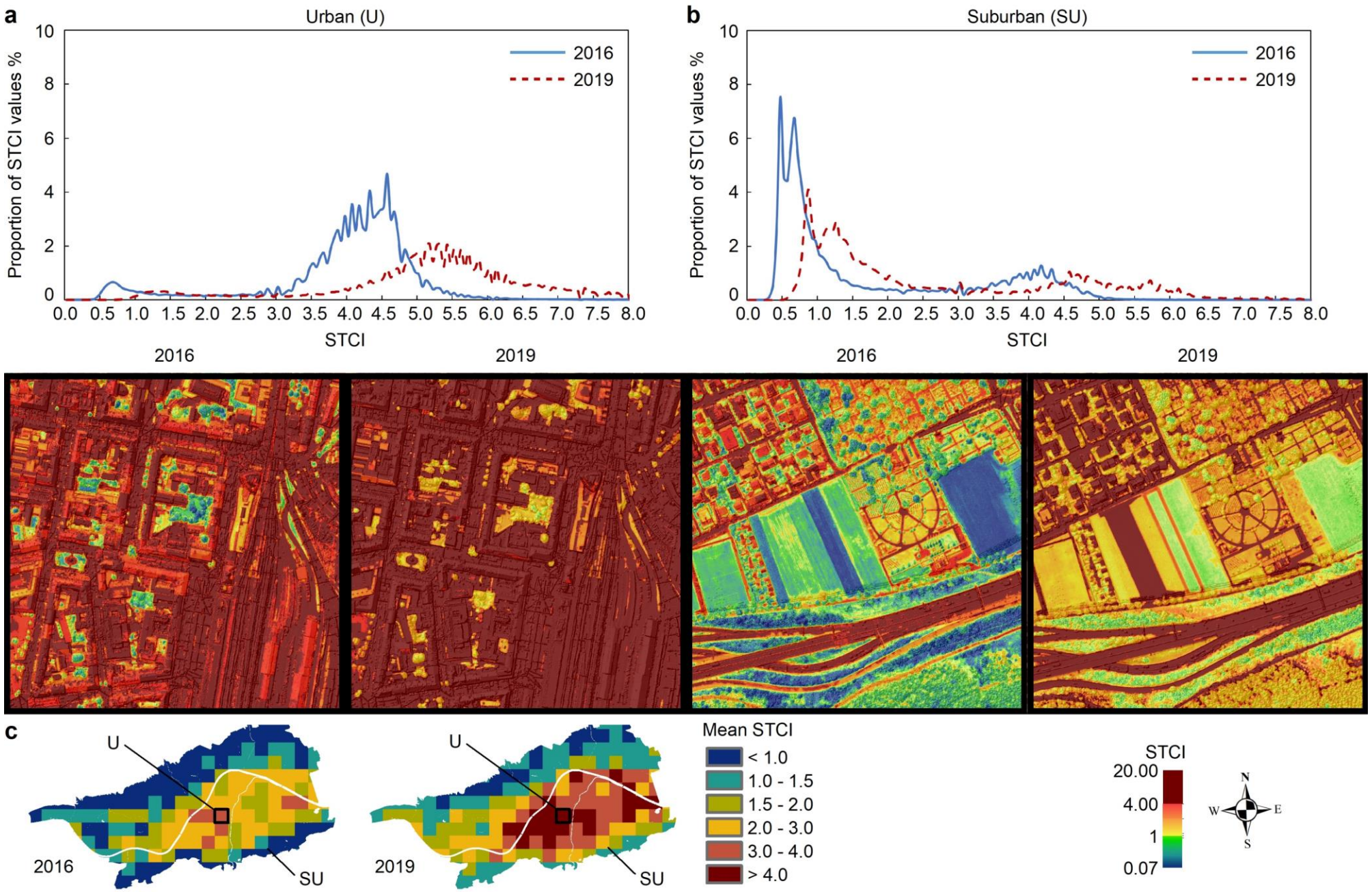


Global




a
2000-2004
STCI
4.00
1
0.07
b
2005-2009
Δ STCI
0.65
0
-0.65
c
2010-2014
d
2015-2019
e
Proportion of STCI values %
STCI
2000 - 2004
2005 - 2009
2010 - 2014
2015 - 2019
f
Proportion of STCI values %
STCI
Forest
Urban
Short Vegetation
Cropland


a
Los Angeles, US
b
Melbourne, AU
c
Shanghai, CN
Proportion of STCI values %
STCI
1999
2007
2015
2019
1999/00
2007/08
2015/16
2019/20
d
e
f
N
W
E
S
STCI
4.00
1
0.07


a
Urban (U)
Proportion of STCI values %
2016
2019
STCI
b
Suburban (SU)
c
U
SU
Mean STCI
< 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 3.0
3.0 - 4.0
> 4.0
STCI
20.00
4.00
1
0.07
N
W
E
S

Conclusions

- Introducing the STCI to assess the surfaces profound implications for the climate system on multiple scale levels.
- Intensification of the global water cycle is reaffirmed.
- Increasing global land evapotranspiration (1999 to 2020) is primarily observable in forested and irrigated regions and dominant in the Northern Hemisphere.
- Intensification of the global water cycle amplifies vulnerability of global cities to prolonged droughts and heatwaves by means of increasing water scarcity.
- Consequently, decreasing capabilities of urban greening to maintain a cooling effect if not irrigated extensively.
- Urgency for comprehensive water management to avoid critical malfunctions in ecological systems interrelating with human well-being.
- STCI can improve hydro climatological studies, intervention assessments and progress tracking on multiple scales and facilitate multilevel communication in climate action.

Thank you for your attention

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OSPP Contest

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