

IRD
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Future Earth and its implication in Asia and Pacific

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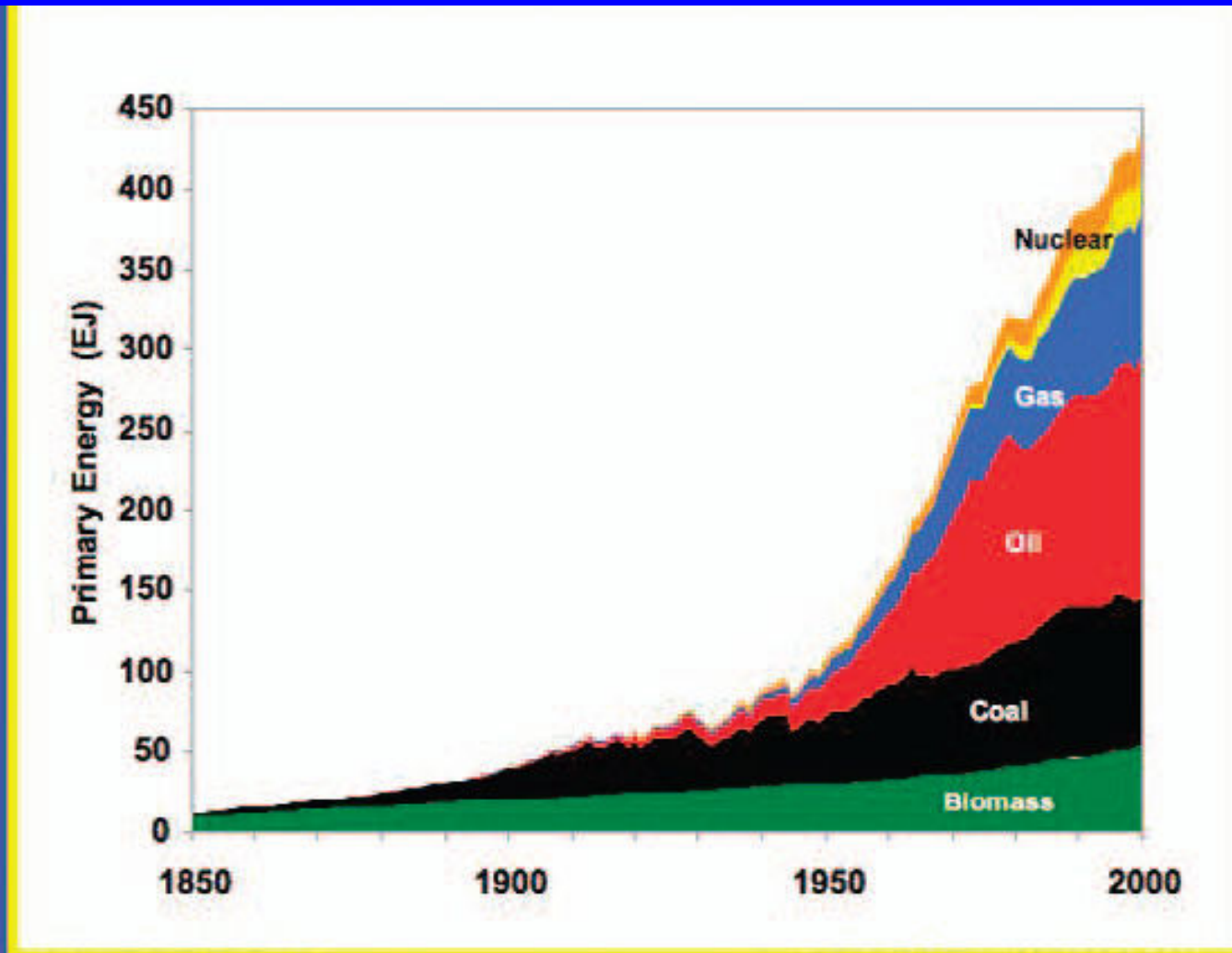
MTSAT JMA

Tetsuzo YASUNARI^{1,2,3}

- 1 Research Institute for Humanity and Nature (RIHN), Kyoto**
- 2 chair, Japan National Committee for Future Earth, SCJ**
- 3 member, Future Earth (International) Scientific Committee**

Rapid increase of energy since around 1950
[Era of dominant influence of human activity on the earth]

The Anthropocene

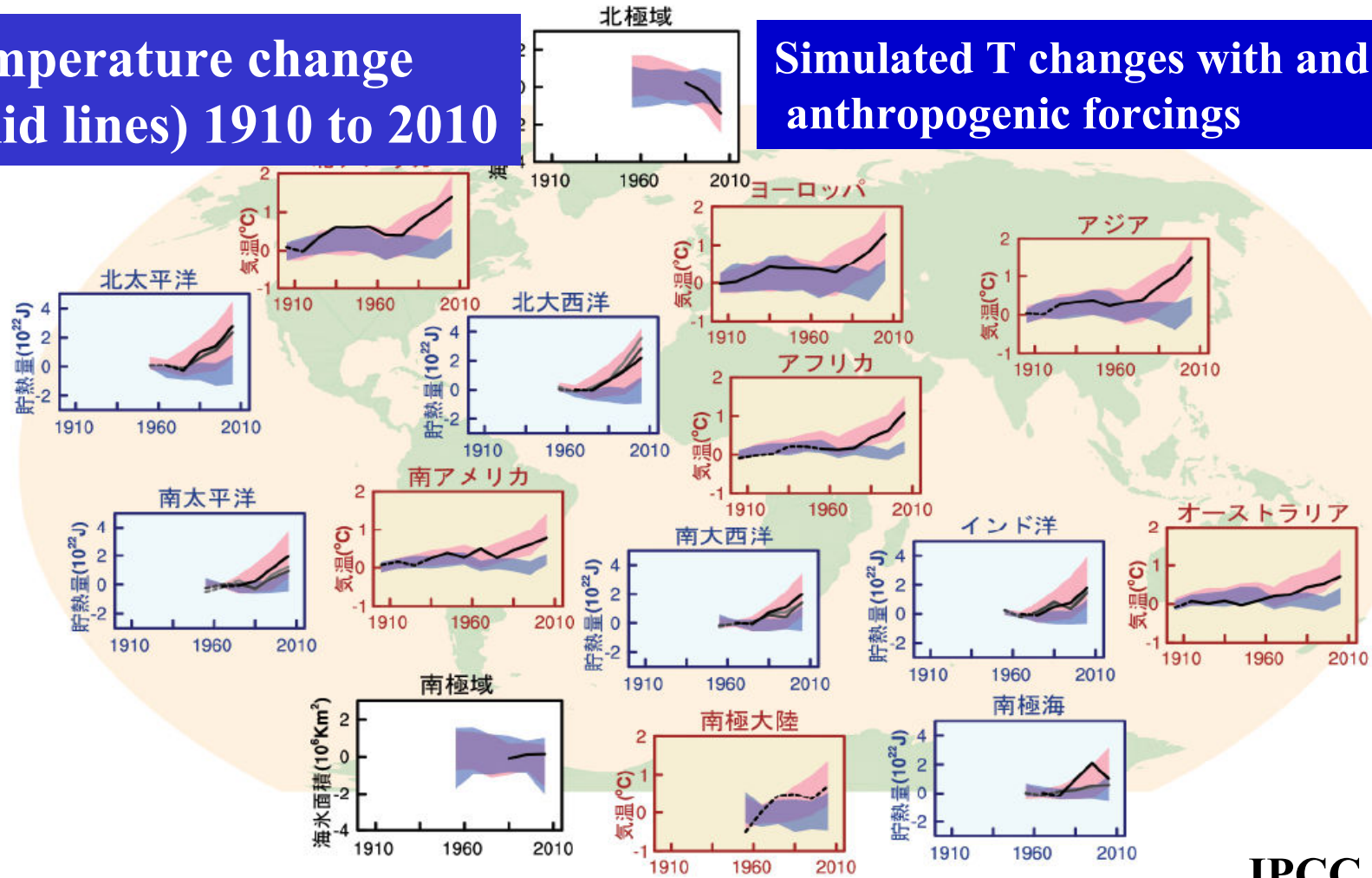


Nakicenovic #1

TU-Wien & IIASA 2003

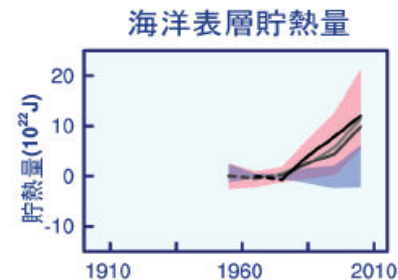
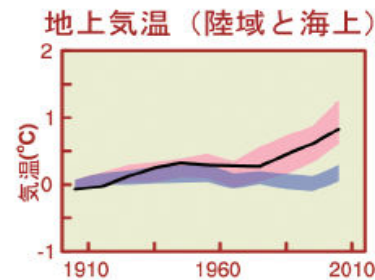
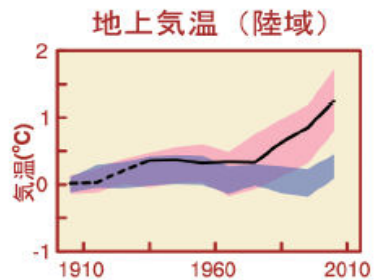
Temperature change
(solid lines) 1910 to 2010

Simulated T changes with and without
anthropogenic forcings



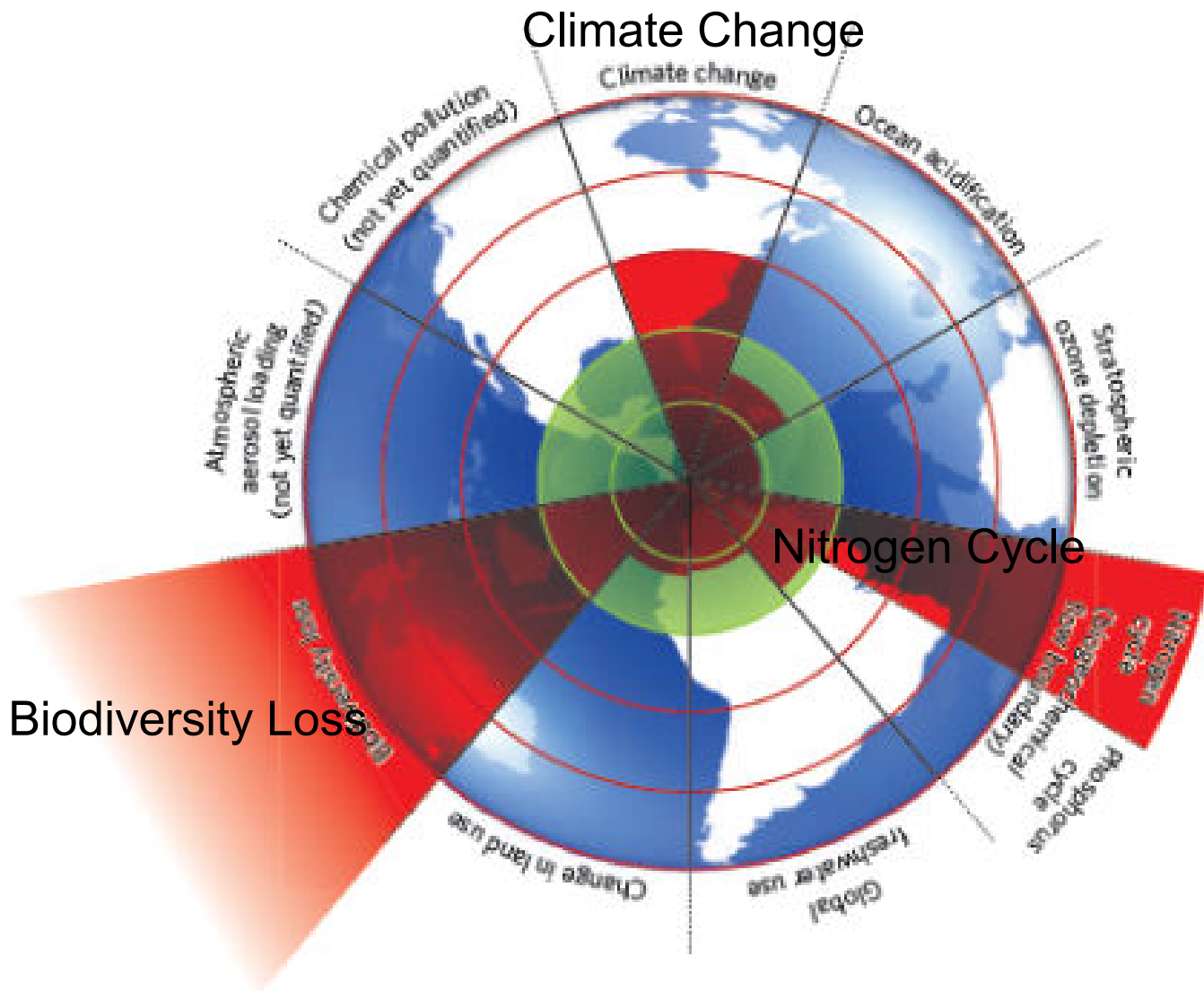
IPCC (2013)

世界平均



The Earth environment is approaching Planetary Boundaries ?

⇒ tipping points of the earth environment change?



Prof. Johan Rockström
Stockholm Resilience
Centre

What is Future Earth?

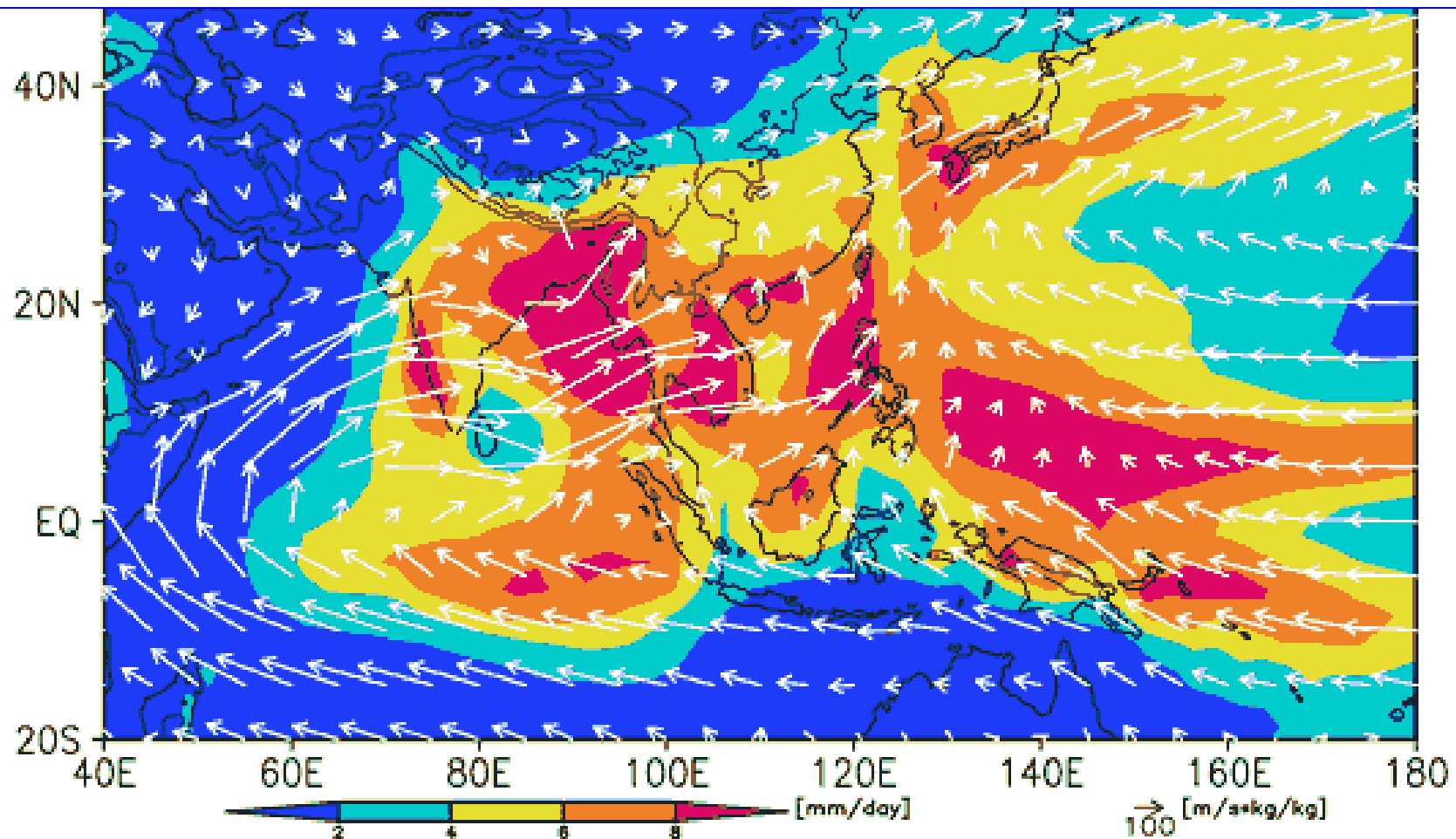
- A **global platform** for international research collaboration on global environmental change and sustainable development
- Provides **integrated research** on major global change challenges and transformations to sustainability
- Strengthens partnerships between researchers, funders and users of research through **co-design/co-production** of research
- Is **solutions-oriented**, aiming to generate knowledge that contributed to new more sustainable ways of doing things

Importance of Future Earth in Asia for local, regional and global sustainability

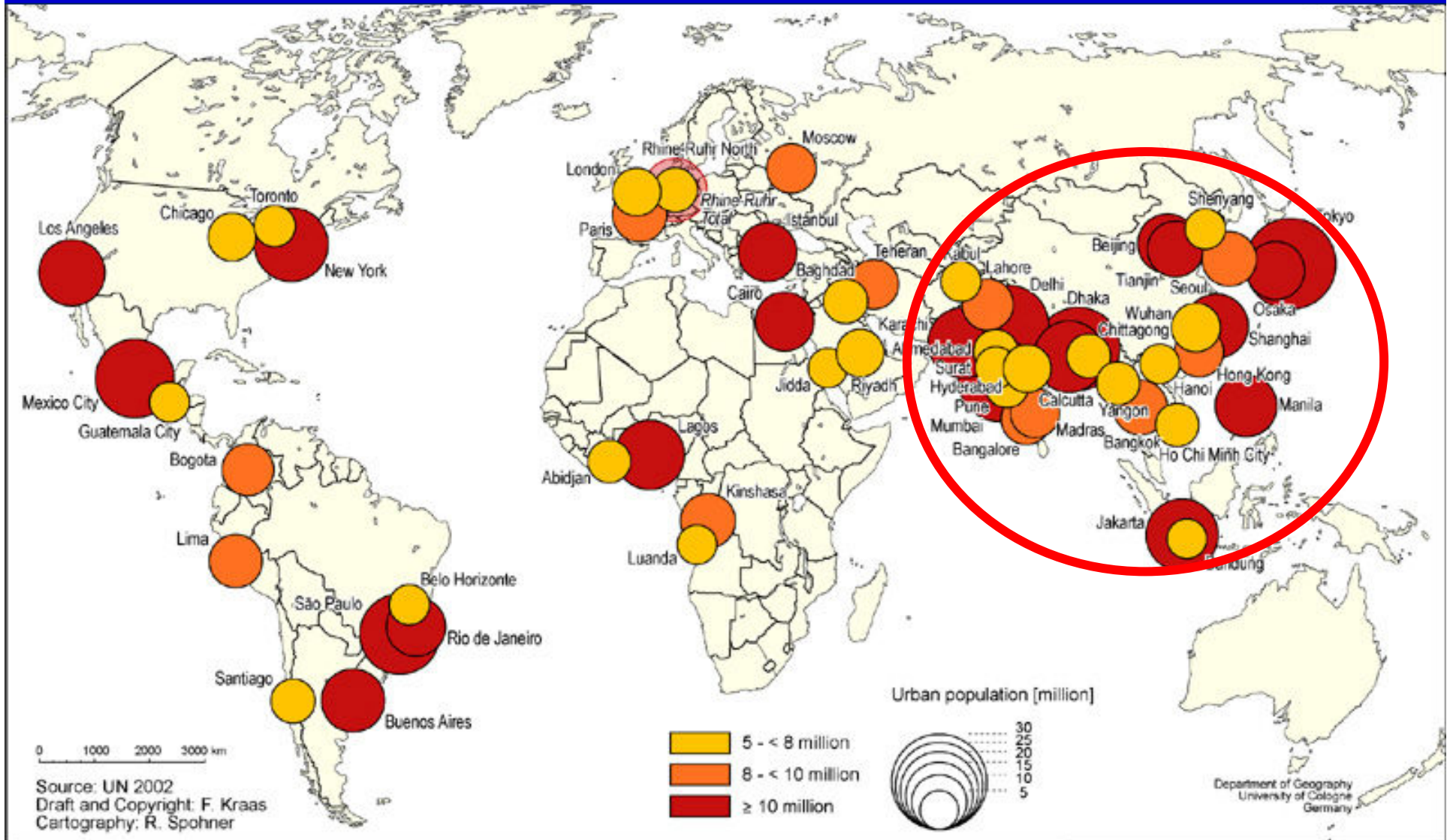


Precipitation and water vapor flux over Asia (June, July August)

The Asian monsoon climate system underpins the ecosystem services on which agriculture, livelihoods and wellbeing of billions of people depend.



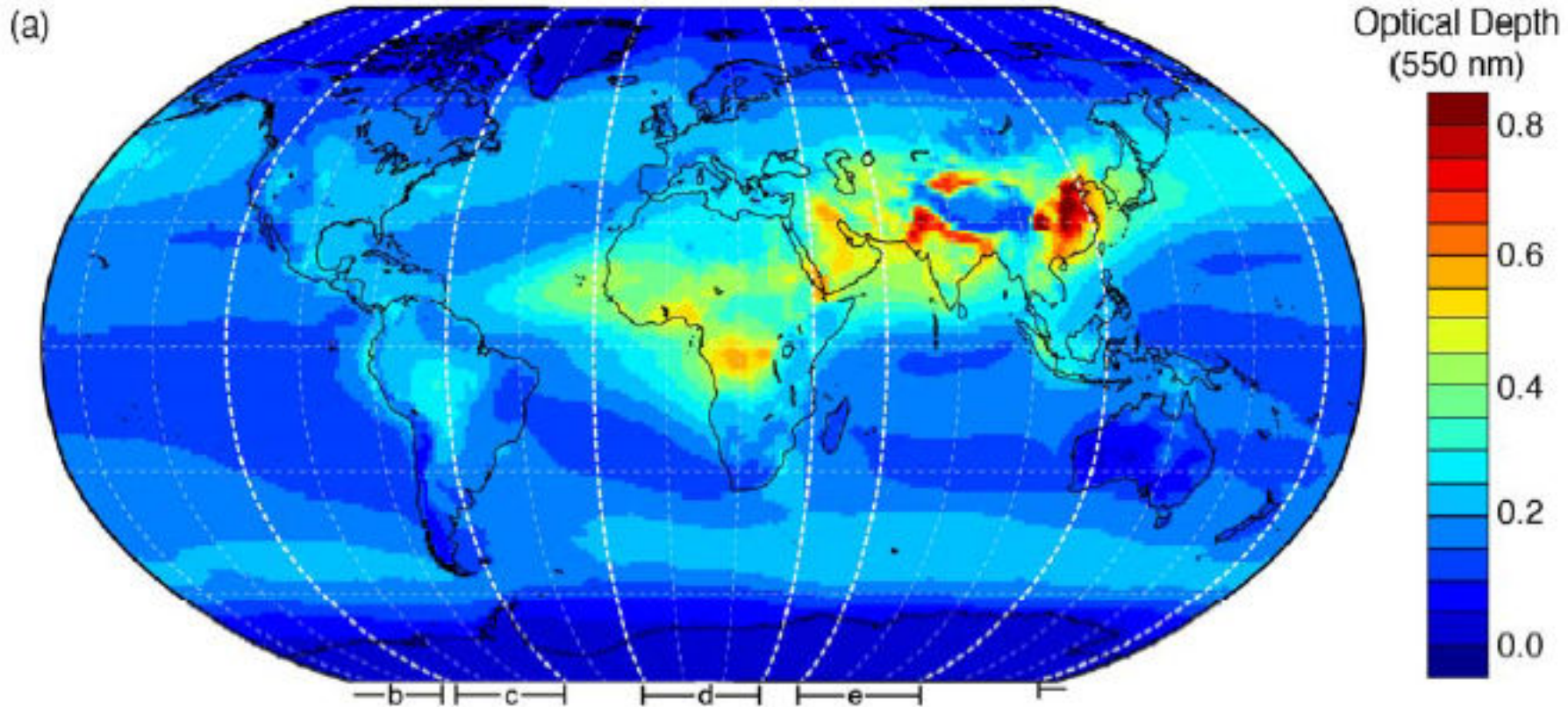
Mega-cities in the world are concentrated in Asia



<http://www.megacities.uni-koeln.de/documentation/megacity/map/MC-2015-PGM.jpg>

**Human impact on the environment
in the Asia/Pacific region
has become enormous
in the recent several decades**

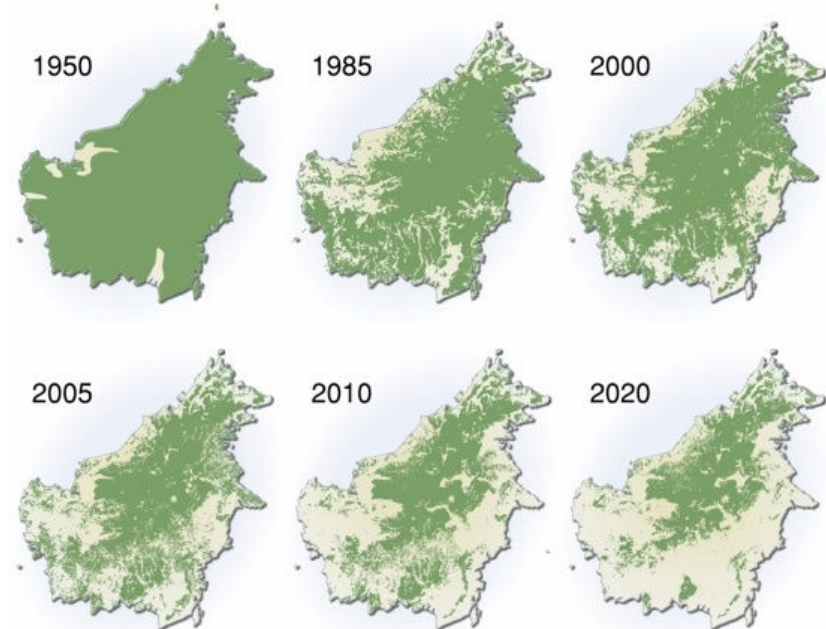
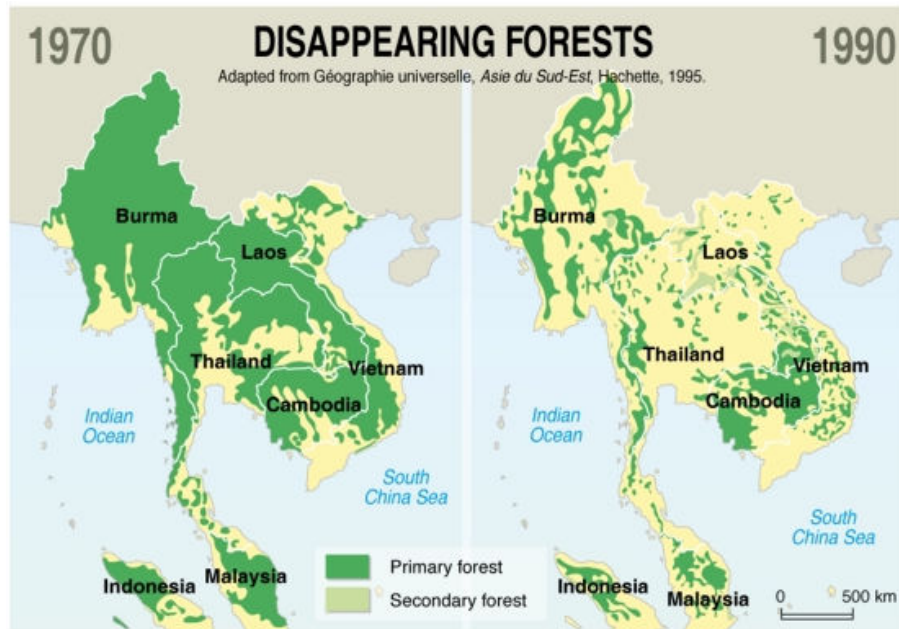
Optical thickness by aerosols (2003-2010) (IPCC, 2013)



**Asia is one of the major emission areas
of Air and water pollutants**

Figure 7.14: a) Spatial distribution of the 550 nm aerosol optical depth (AOD, unitless) from the ECMWF Integrated Forecast System model with assimilation of MODIS aerosol optical depth (Benedetti et al., 2009; Morcrette et al., 2009) averaged over the period 2003–2010.

Rapid Forest loss in South East Asia



Asia is experiencing significant transformation of terrestrial and aquatic ecosystems. Most extensively, forest disruption and conversion continues in developing countries, particularly in the tropics in the late 20th century, causing big biodiversity loss and regional hydro-climate change.

**Impacts of GHG increase
on climate, extreme weather events,
and sea level are becoming serious
over the whole globe,
particularly in Asia-Pacific region**

Change of population exposure to inundation due to sea-level rise (current vs. in 2050)

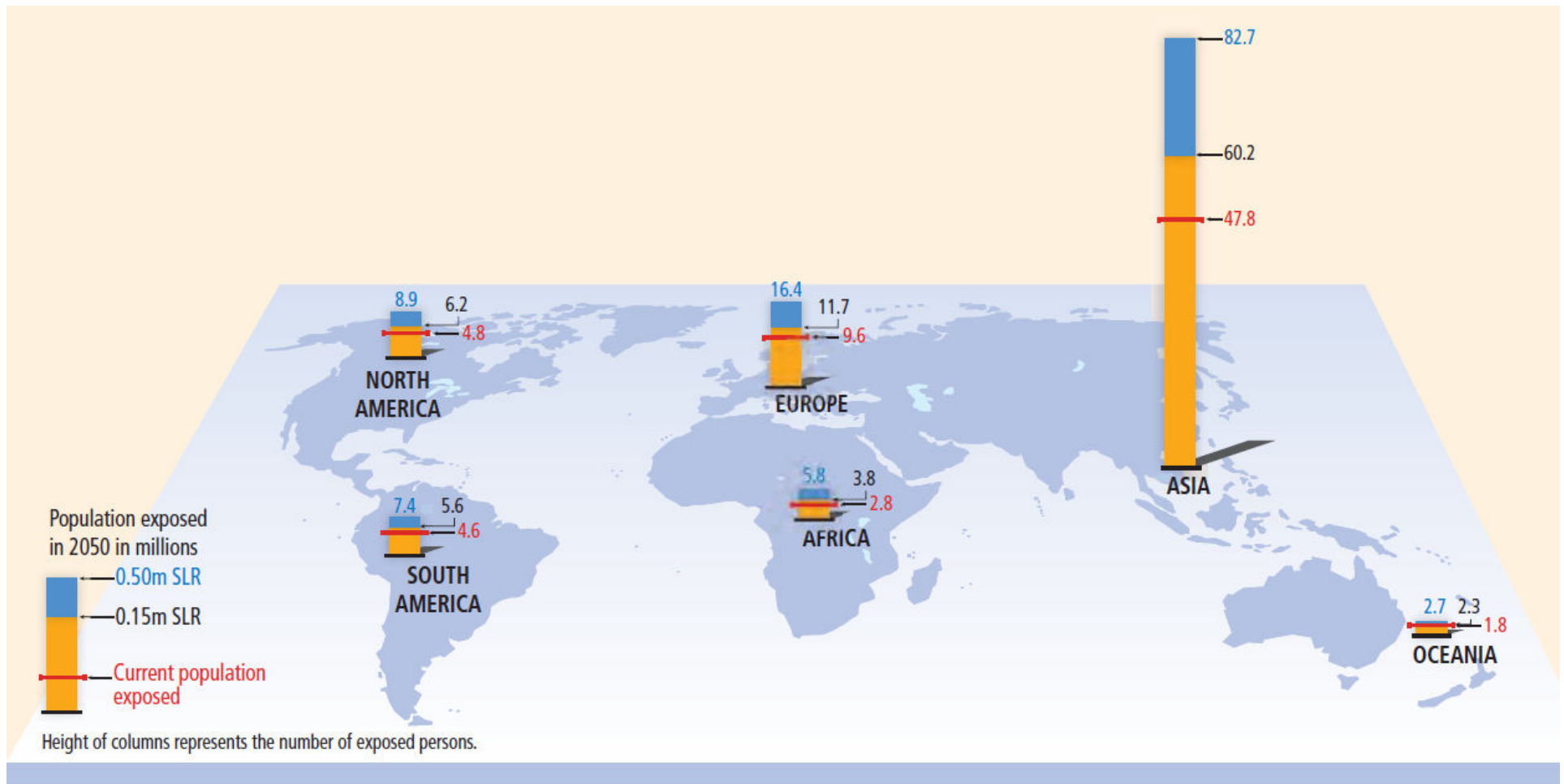
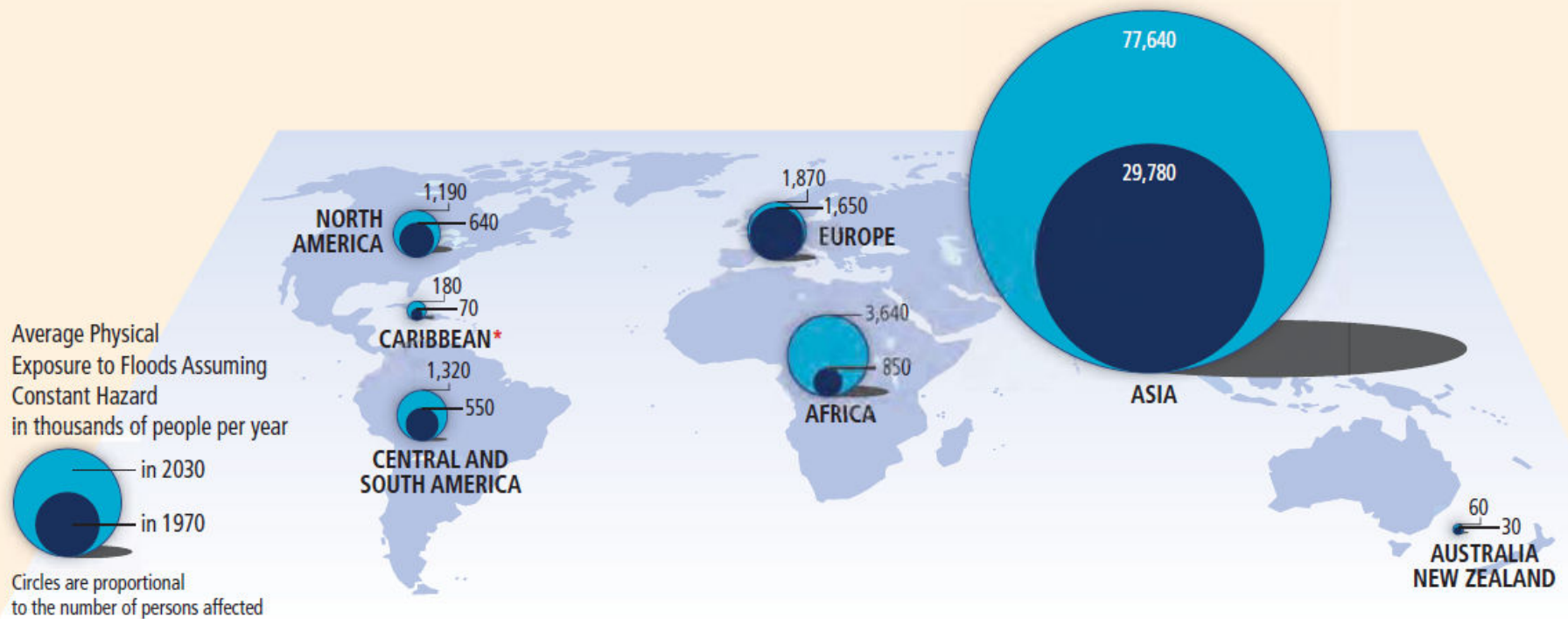


Figure 4-5 | For low-elevation coastal areas, current and future (2050) population exposure to inundation in the case of the 1-in-100-year extreme storm for sea level rise of 0.15 m and for sea level rise of 0.50 m due to the partial melting of the Greenland and West Antarctic Ice Sheets. Data from Lenton et al., 2009.

Change of population exposure to floods (in 1970 & 2030)

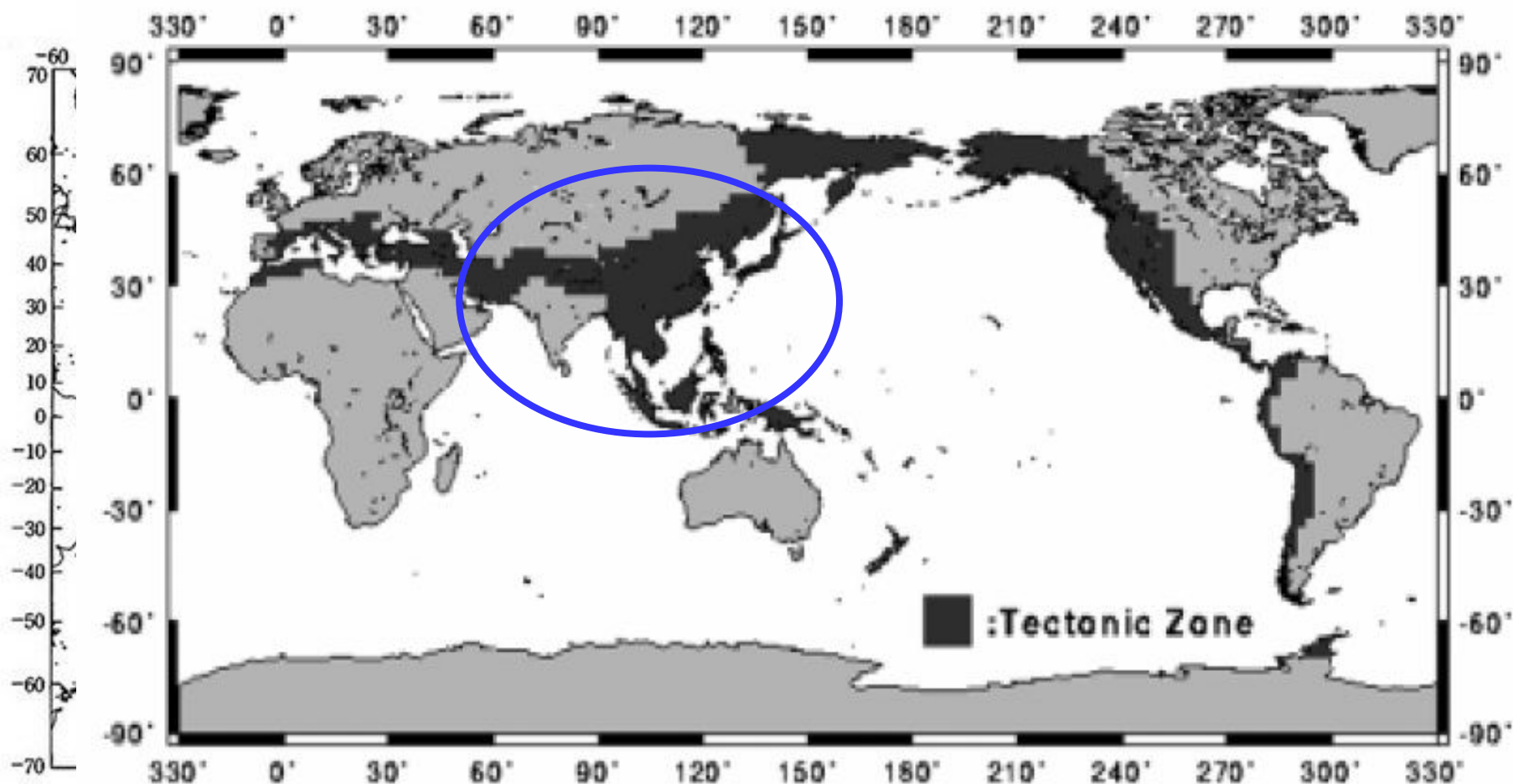


*Only catchments bigger than 1,000 km² were included in this analysis. Therefore, only the largest islands in the Caribbean are covered.

Figure 4-2 | Average physical exposure to floods assuming constant hazard (in thousands of people per year). Data from Peduzzi et al., 2011.

World distribution of earthquake and tectonic zone, centered in Asia/Pacific.

図2 変動帯の世界分布



出所：Strahler, A.H. And Strahler, A. N. (1992) *Modern Physical Geography*, John Wiley & Sons, Inc. より作成

The Great Earthquake & Tsunami in Eastern Japan 2011.3.11



The Asian/Pacific Benefit & Challenge

- **This region is located in the midst of monsoon climate and the huge tectonic zone. These natural conditions cause high frequency of natural disasters, but also provide rich natural resources for agriculture, forestry & fisheries.**
- **The region as a whole is characterized by rapid population and economic growth and urbanization, causing great disparities of wealth both within and between countries, and social and ecological vulnerability to the potential impacts of climate change and natural disasters.**
- **Associated with this rapid population & economic growth, this region has become a huge hot-spot of GHG increase, air and water pollutions, seriously affecting human livelihood, well-being and health.**

Needs for International and multi-national collaboration in Asia/Pacific

- **The Asia/Pacific region needs to improve its capacity for risk management of both natural disasters (climate change, extreme weather events, and tectonic events) , human-caused environmental issues (pollutions, deforestation etc.), and their complex problems.**
- **The complexity of sustainability issues in this region requires visionary political and scientific leadership and high level of exchange and coordination between different epistemic communities in the multi- and international scales.**
- **For these purposes, Future Earth and IRDR should tightly collaborate with each other, particularly in the Asia/Pacific region.**



謝謝

Thank you

very much !