UFMG

UNIVERSIDADE FEDERAL
DE MINAS GERAIS

Antropoceno e processos ecológicos

PROF. RICARDO SOLAR ICB/UFMG

GT599 - P&D ANEEL - CEMIG

UFMG - CEMIG - FUNDEP

Laboratório de
Ecologia & Biodiversidade
no Antropoceno

Amazon forest, Paragominas, Brazil

Adam Ronan/RAS

Amazon forest, Santarém, Brazil

Campos Rupestres, Minas Gerais, Brazil

Campos Rupestres, Minas Gerais, Brazil

Quais os processos ecológicos determinam a persistência da biodiversidade em paisagens modificadas por ações antrópicas?

Adam Ronan/RAS

TÓPICOS ABORDADOS

- Bem vindo ao Antropoceno
- Bases conceituais & Processos Ecológicos
    - Mudanças globais
    - Limites planetários
    - A importância dos ambientes tropicais
- Conclusões e perspectivas

TÓPICOS ABORDADOS

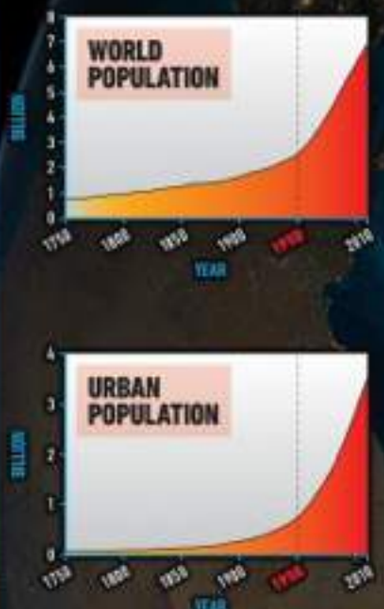
- **Bem vindo ao Antropoceno**
- Bases conceituais & Processos Ecológicos
  - Mudanças globais
  - Limites planetários
  - A importância dos ambientes tropicais
- Conclusões e perspectivas

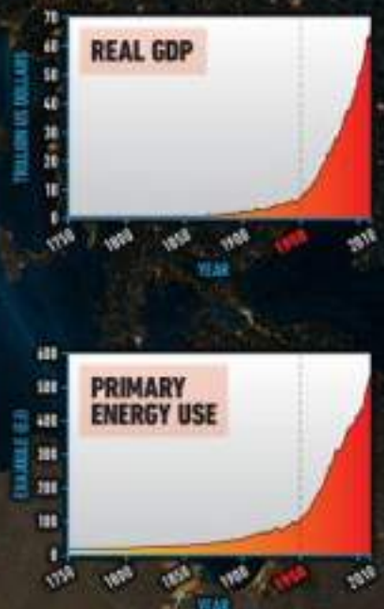
PRESENÇA HUMANA NO PLANETA

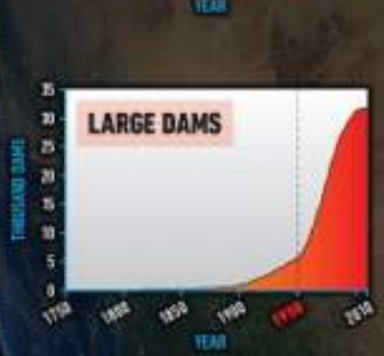
- 7.7 bilhões de pessoas
- ~9 bilhões em 2050
- Desenvolvimento
- Sustentabilidade?
- Estabilidade planetária?

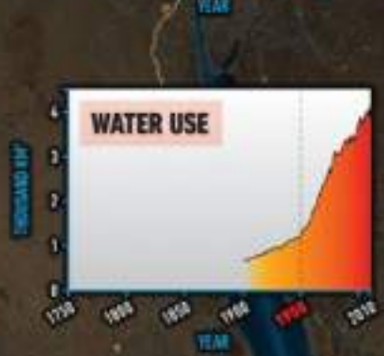
THE GREAT ACCELERATION ~1950

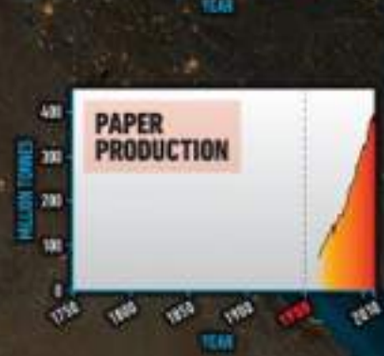
SOCIO-ECONOMIC TRENDS



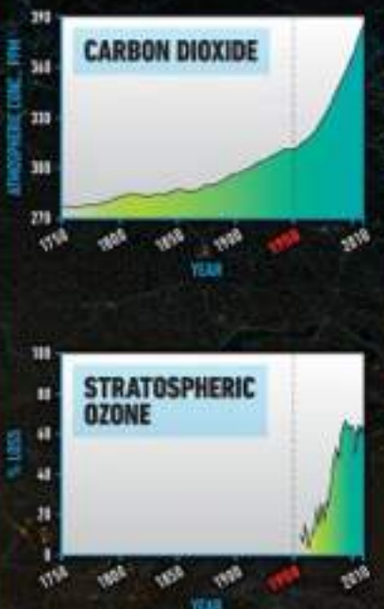


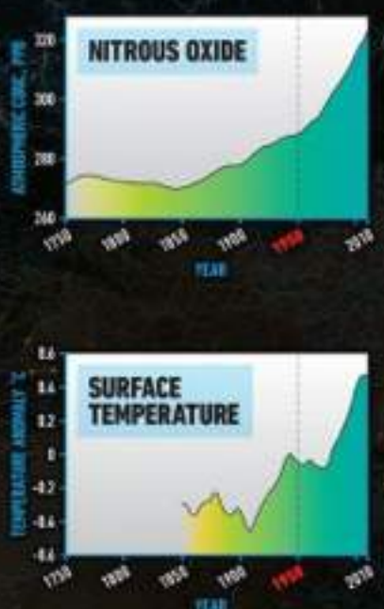


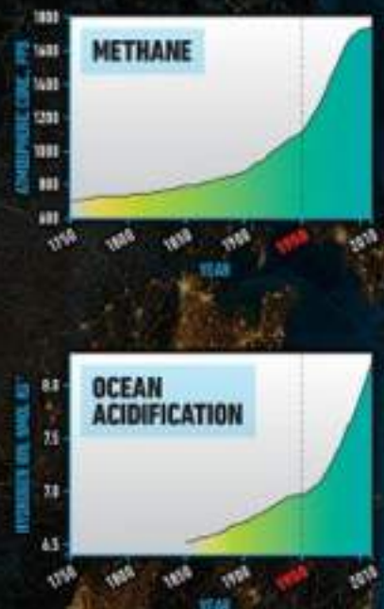


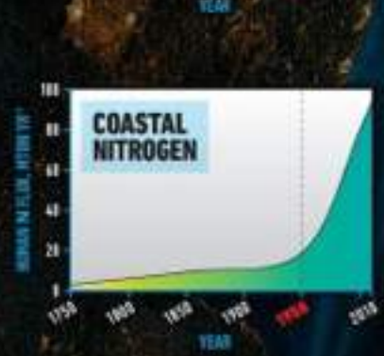


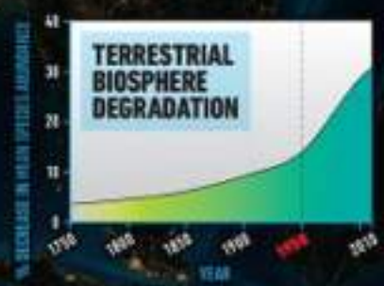
EARTH SYSTEM TRENDS









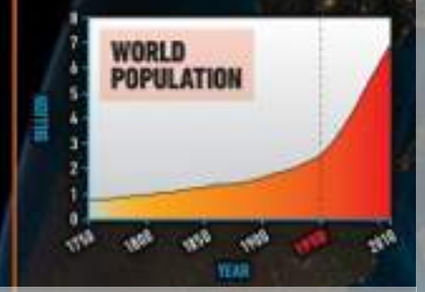


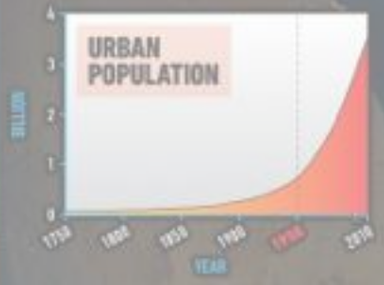
REFERENCE: Steffen, W., W. Broadgate, L. Deutsch, O. Gaffney and C. Ludwig. The Trajectory of the Anthropocene: the Great Acceleration, *The Anthropocene Review*, 16 January 2015.

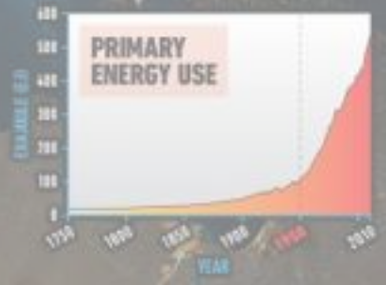
MAP & DESIGN: Félix Pharand-Deschênes / Globaia

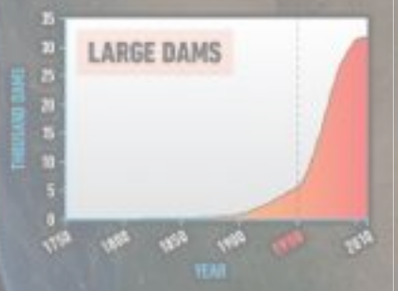
THE GREAT ACCELERATION ~1950

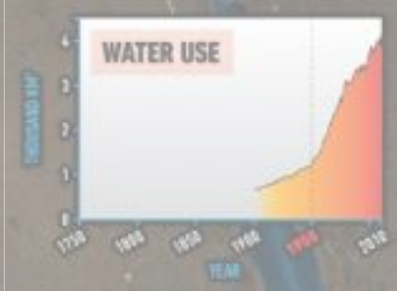
SOCIO-ECONOMIC TRENDS

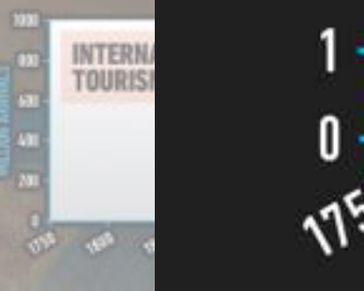




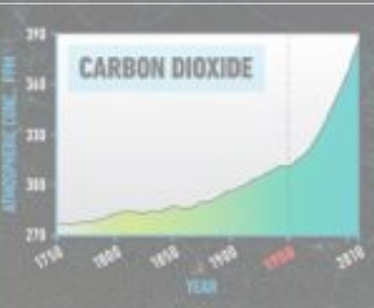


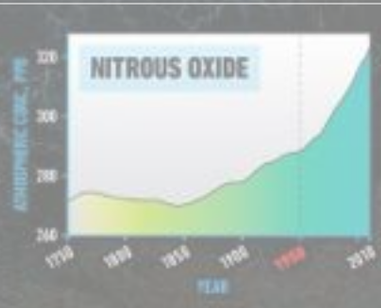


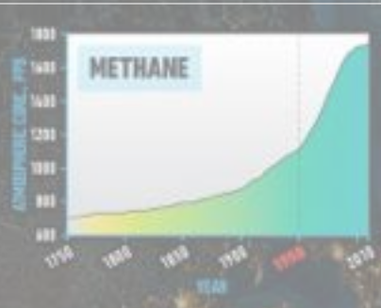




EARTH SYSTEM TRENDS

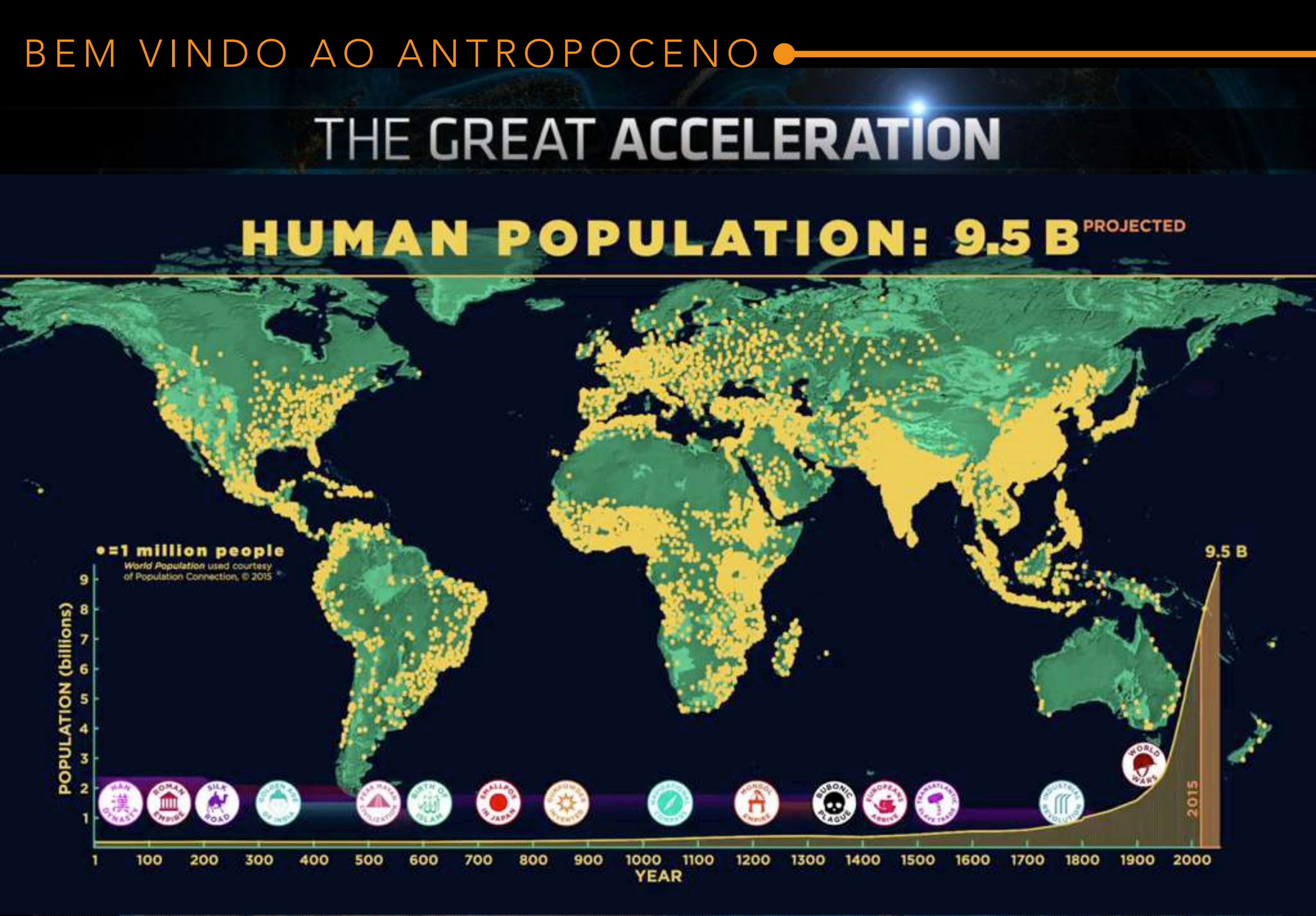






REFERENCE: Steffen, W., W. Broadgate, L. Deutsch, O. Gaffney and C. Ludwig. The Trajectory of the Anthropocene
MAP & DESIGN: Félix Pharand-Deschênes / Globaia

BEM VINDO AO ANTROPOCENO

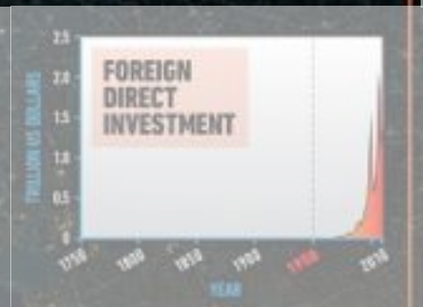


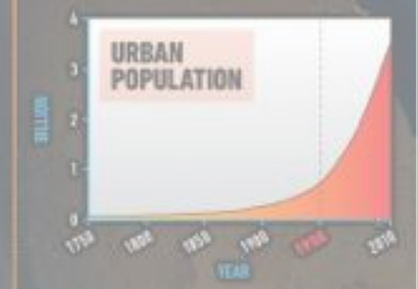
REFERENCE: Steffen, W., W. Broadgate, L. Deutsch, O. Gaffney and C. Ludwig. The Trajectory of the Anthropocene: the Great Acceleration, *The Anthropocene Review*, 16 January 2015.
MAP & DESIGN: Félix Pharand-Deschênes / Globaia

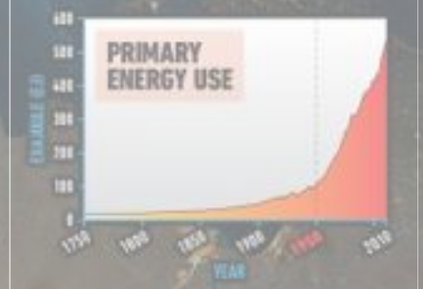
http://www.anthropocene.info/index.php

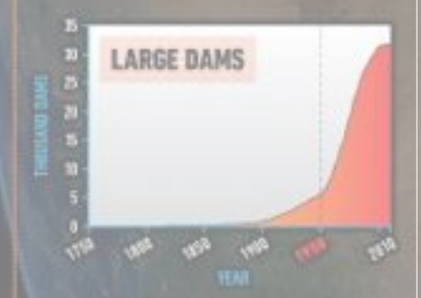
THE GREAT ACCELERATION ~1950

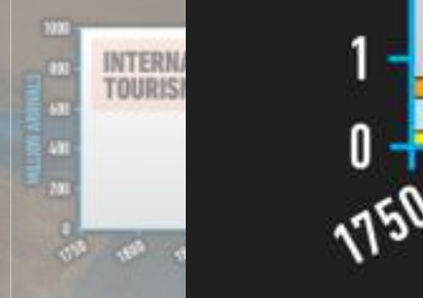
SOCIO-ECONOMIC TRENDS



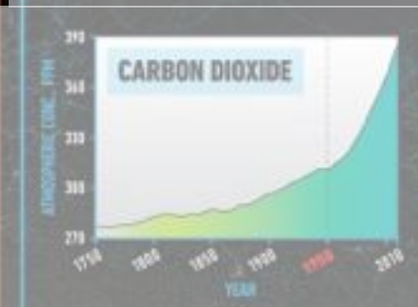


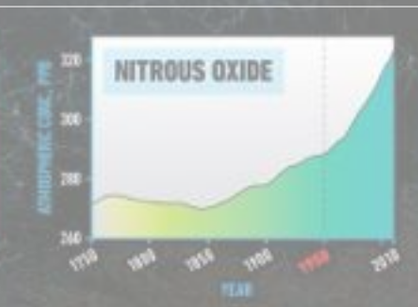


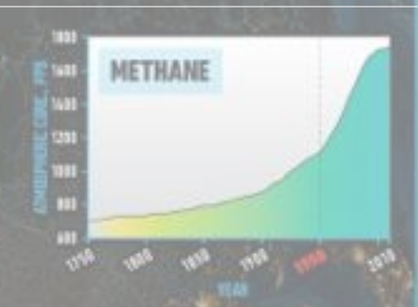


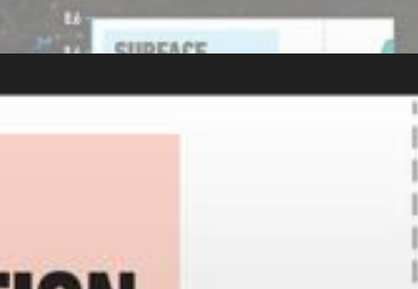


EARTH SYSTEM TRENDS









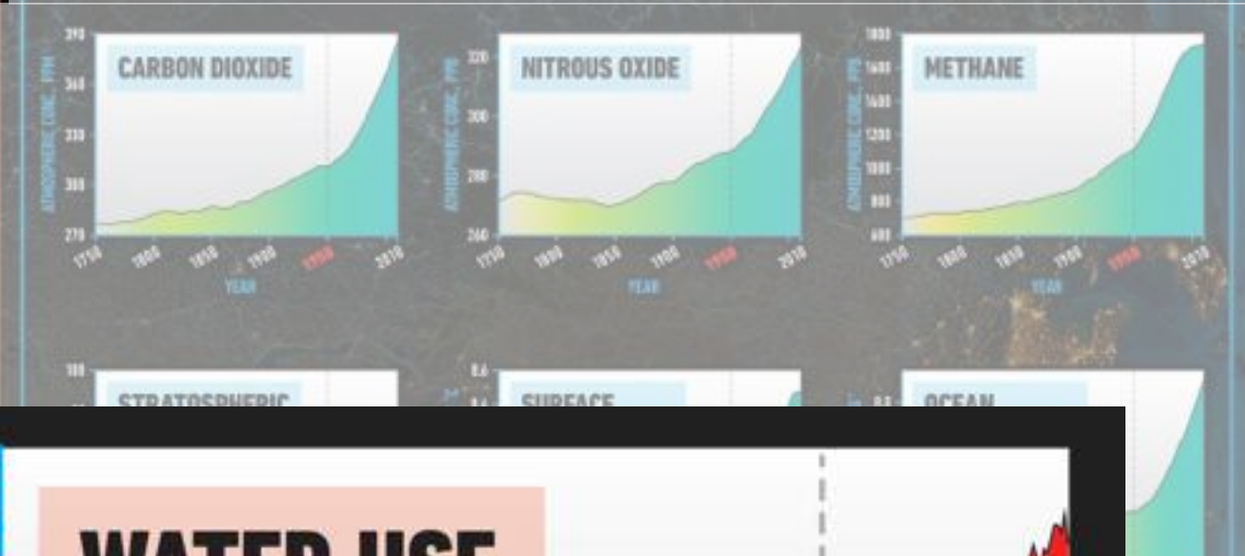
REFERENCE: Steffen, W., W. Broadgate, L. Deutsch, O. Gaffney and C. Ludwig. The Trajectory of the Anthropocene

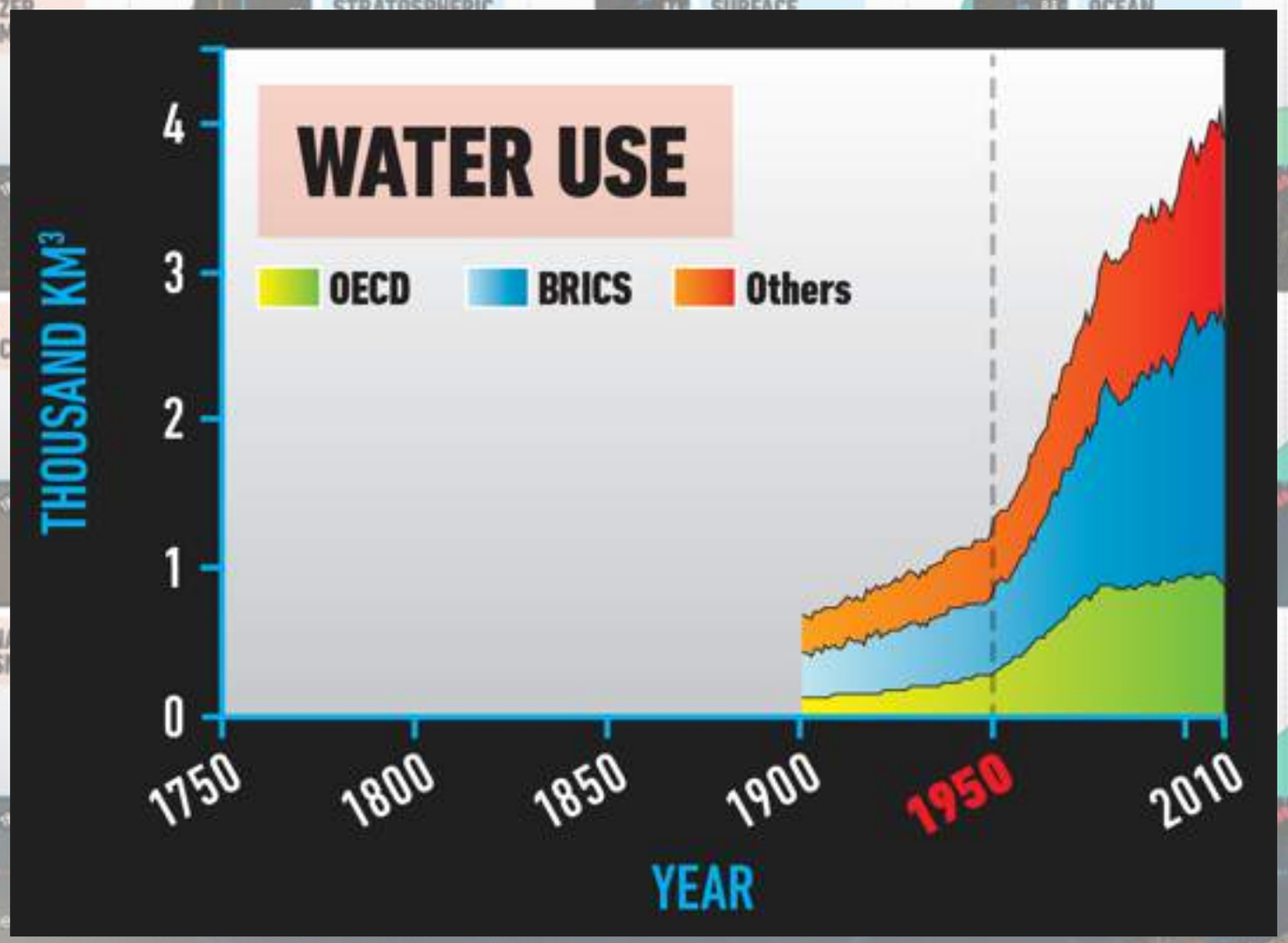
MAP & DESIGN: Félix Pharand-Deschênes / Globaia

THE GREAT ACCELERATION ~1950

SOCIO-ECONOMIC TRENDS

EARTH SYSTEM TRENDS



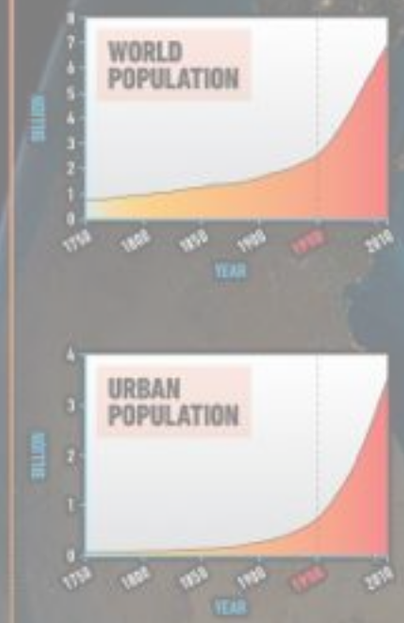


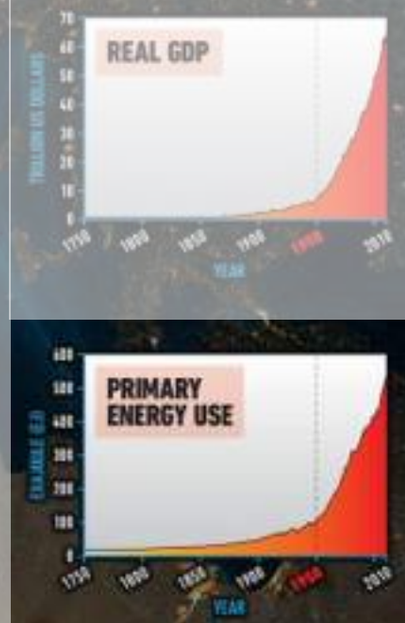
REFERENCE: Steffen, W., W. Broadgate, L. Deutsch, O. Gaffney and C. Ludwig. The Trajectory of the Anthropocene

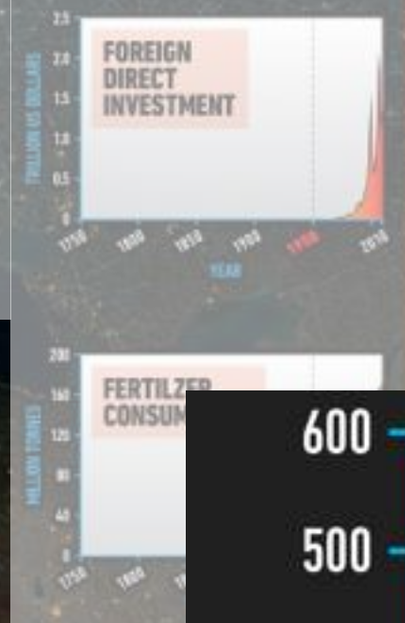
MAP & DESIGN: Félix Pharand-Deschênes / Globaia

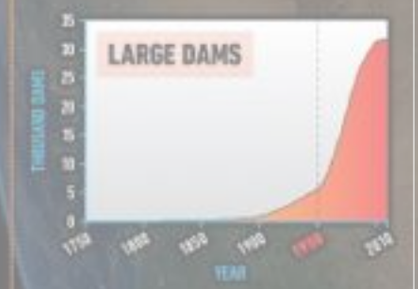
THE GREAT ACCELERATION ~1950

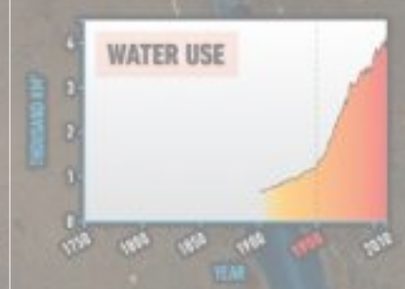
SOCIO-ECONOMIC TRENDS

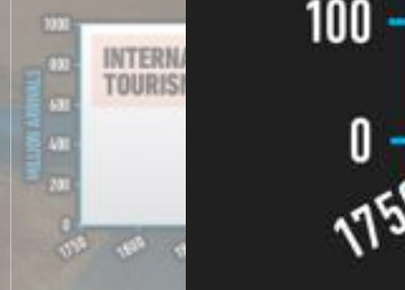




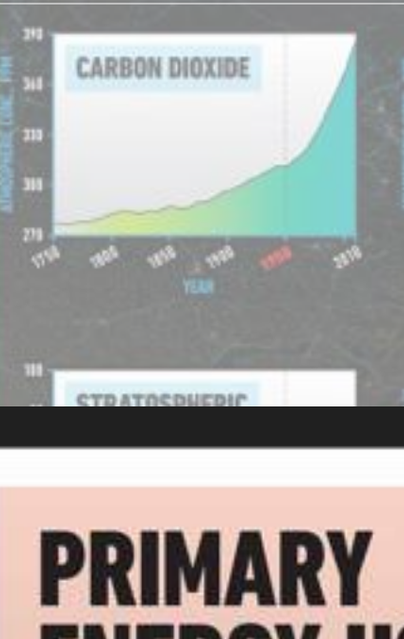


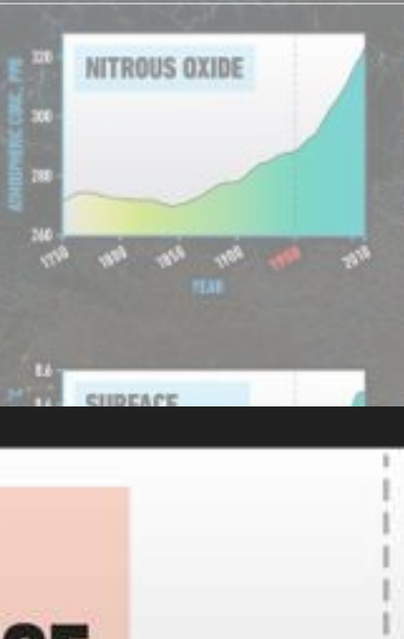


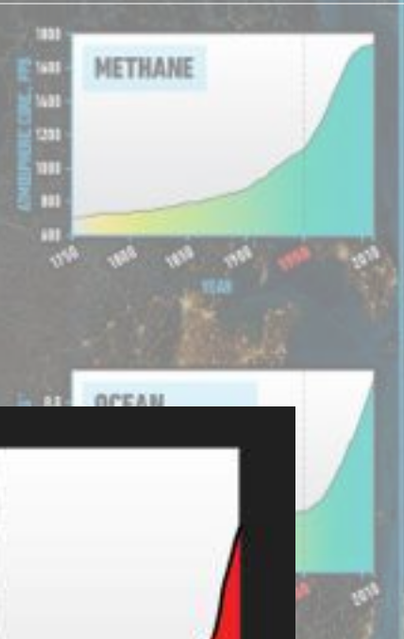




EARTH SYSTEM TRENDS





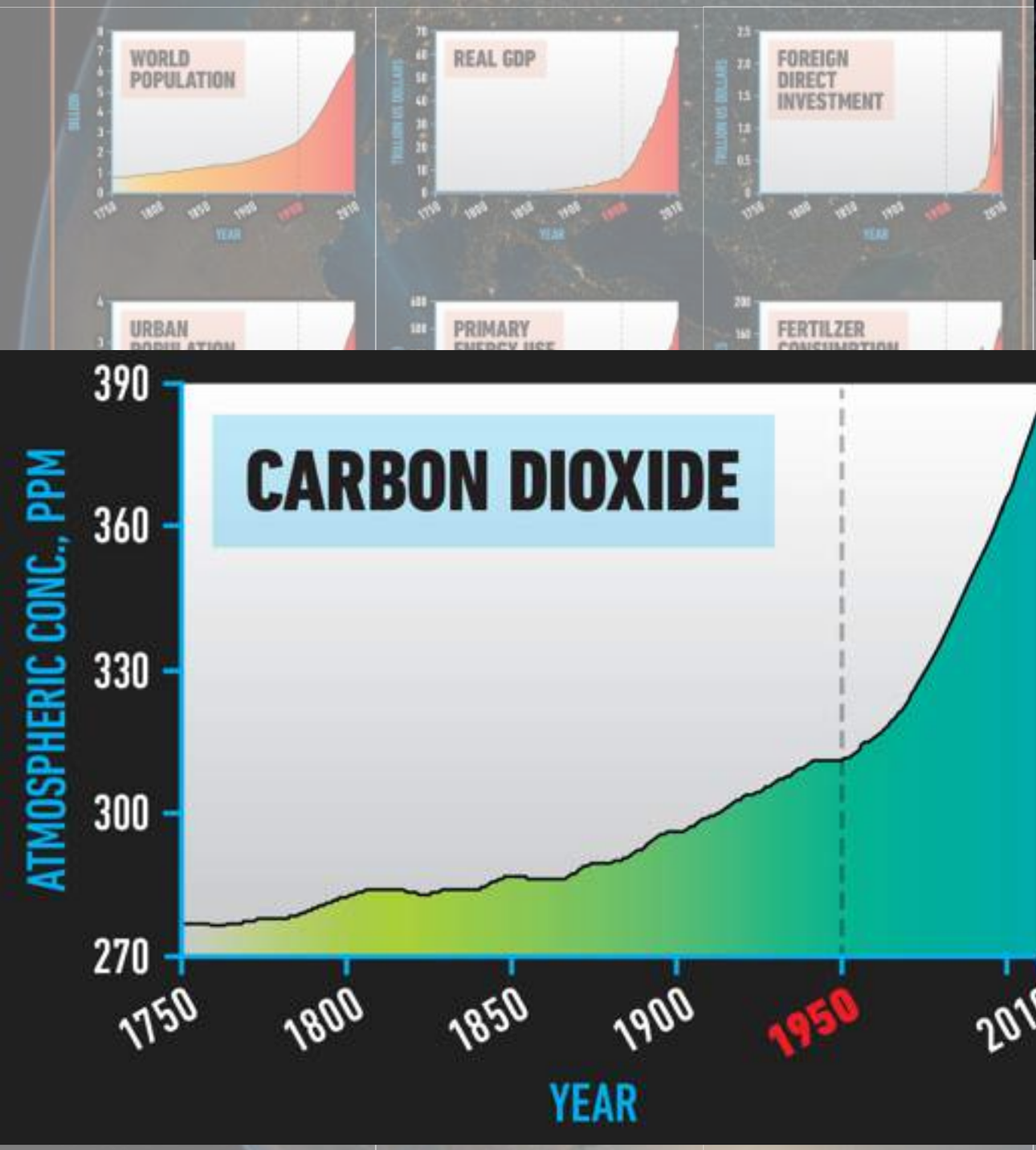


REFERENCE: Steffen, W., W. Broadgate, L. Deutsch, O. Gaffney and C. Ludwig. The Trajectory of the Anthropocene
MAP & DESIGN: Félix Pharand-Deschênes / Globaia

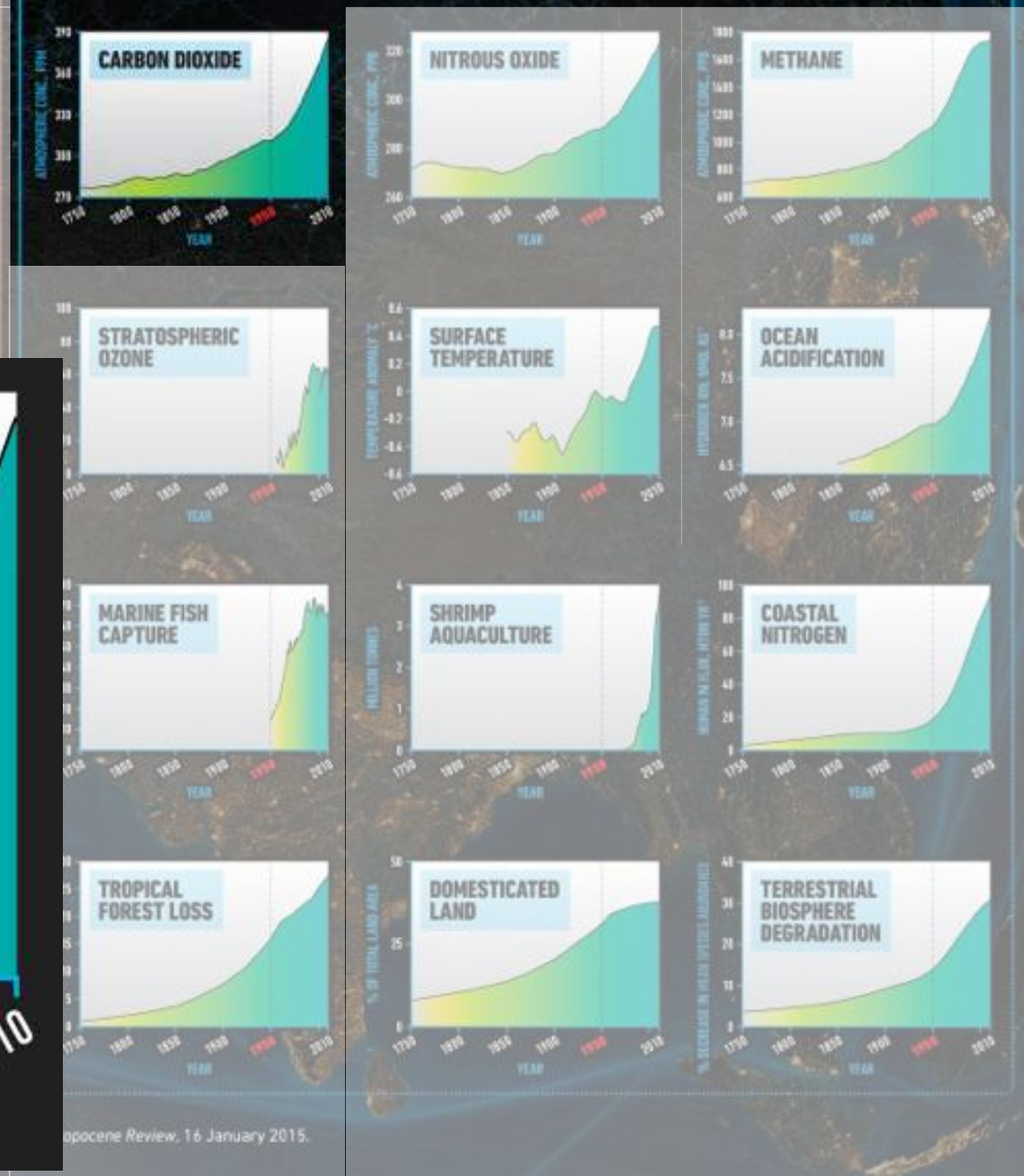
BEM VINDO AO ANTROPOCENO

THE GREAT ACCELERATION ~1950

SOCIO-ECONOMIC TRENDS



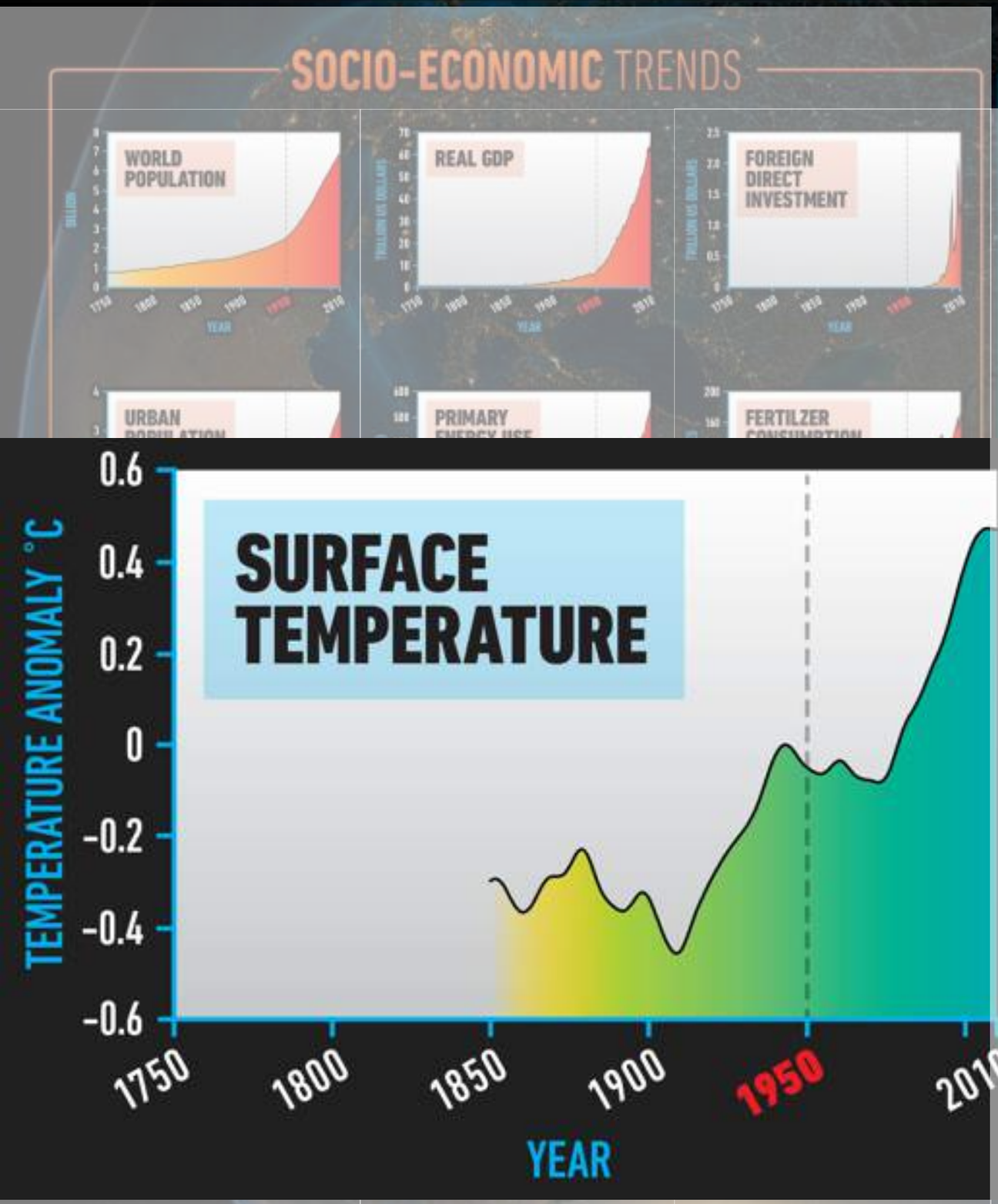
EARTH SYSTEM TRENDS



pocene Review, 16 January 2015.

THE GREAT ACCELERATION ~1950

SOCIO-ECONOMIC TRENDS

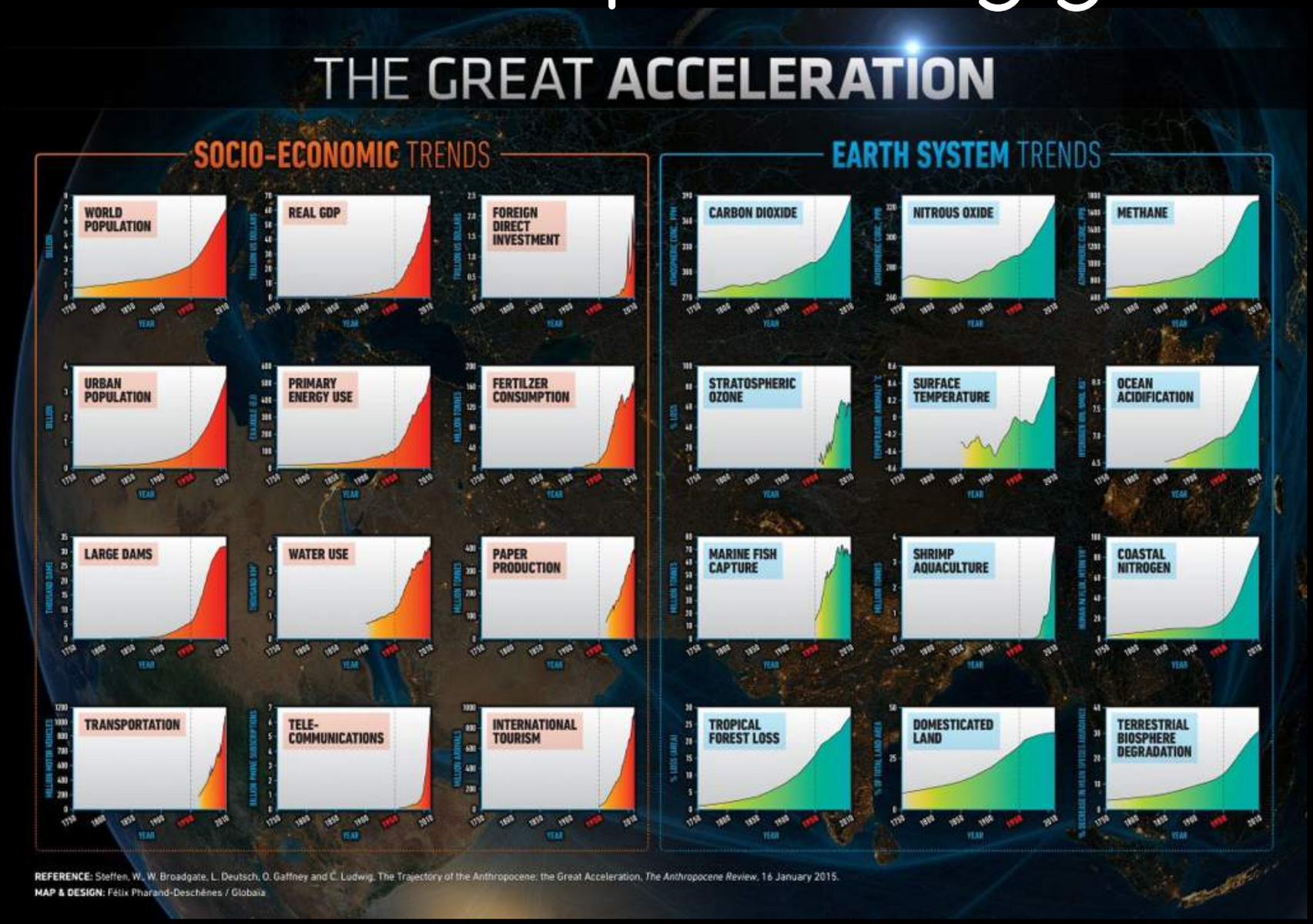


EARTH SYSTEM TRENDS

opocene Review, 16 January 2015.

PRESENÇA HUMANA NO PLANETA

"Mundo pequeno" em um planeta gigante



"Mundo gigante" em um planeta pequeno

BEM VINDO AO ANTROPOCENO

THE NEXT GOLDEN STATE: A 16-PAGE SPECIAL REPORT ON AUSTRALIA

The Economist

Obama, Bibi and peace
Huntsman blows his horn
A soft landing for China
The costly war on cancer
How the brain drain reduces poverty

MAY 28TH–JUNE 3RD 2011 Economist.com

Welcome to the Anthropocene

Geology's new age

nature

THE INTERNATIONAL WEEKLY JOURNAL OF SCIENCE

THE HUMAN EPOCH

Defining the Anthropocene PAGES 144 & 171

CONFLICT RESOLUTION

BUILDING BRIDGES

Long-standing disputes can be fixed — in theory

PAGE 148

LINGUISTICS

SCIENTIFICALLY SPEAKING

How English became the academic lingua franca

PAGE 154

RISK MANAGEMENT

TAKING IT PERSONALLY

Model the growing interconnectivity of risk

PAGE 151

NATURE.COM/NATURE

12 March 2015

ANTROPOCENO

Uma nova época geológica em que a **atividade humana** é a força dominante que modifica a *geologia, clima e ecossistemas do planeta Terra*

z

http://www.anthropocene.info/index.php

TÓPICOS ABORDADOS

- Bem vindo ao Antropoceno
- **Bases conceituais & Processos Ecológicos**
    - **Mudanças globais**
    - **Limites planetários**
    - **A importância dos ambientes tropicais**
- Conclusões e perspectivas

BASES CONCEITUAIS

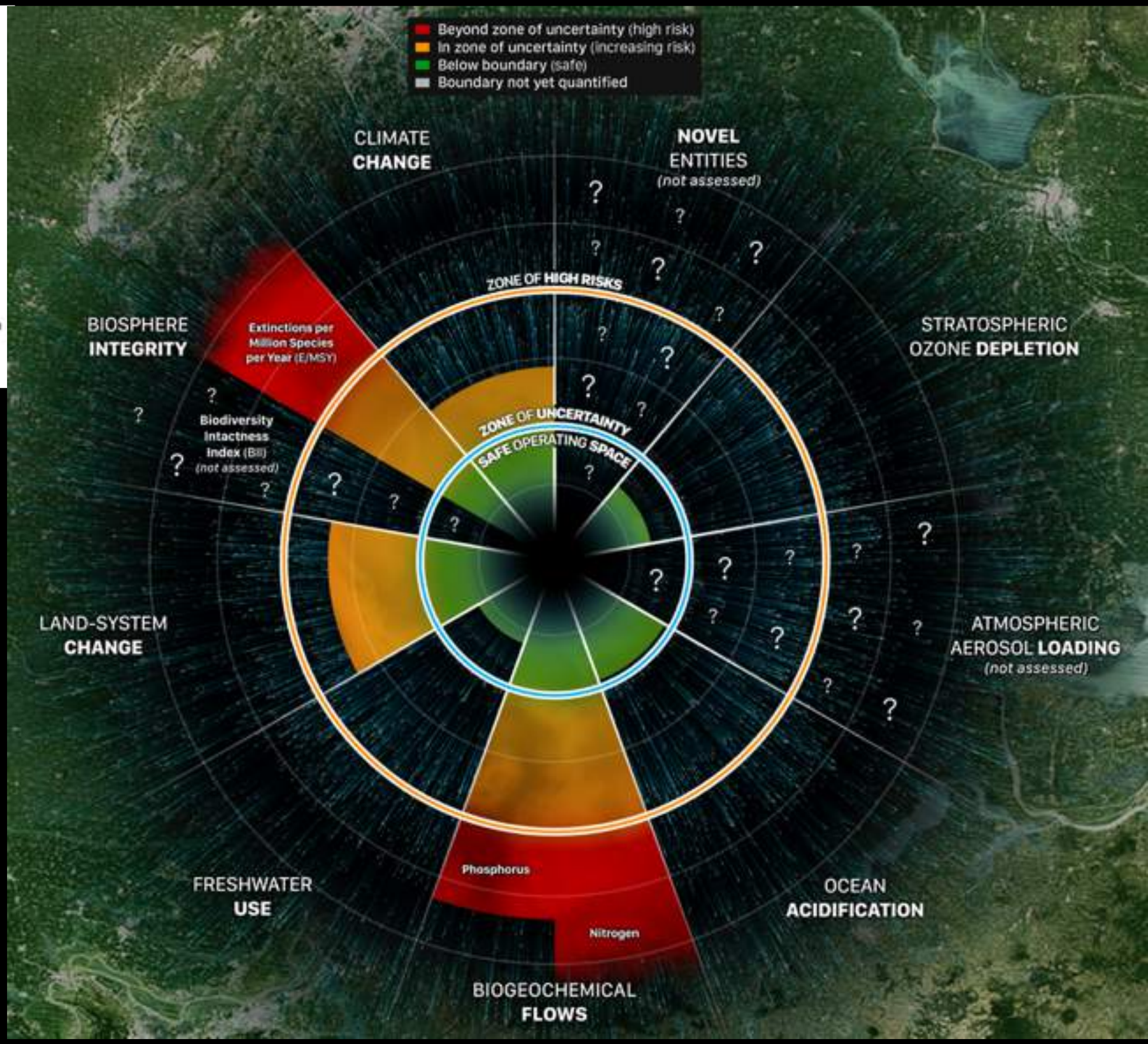
RESEARCH ARTICLE

SUSTAINABILITY

Planetary boundaries: Guiding human development on a changing planet

Will Steffen,[1,2]* Katherine Richardson,[3] Johan Rockström,[1] Sarah E. Cornell,[1] Ingo Fetzer,[1] Elena M. Bennett,[4] Reinette Biggs,[1,5] Stephen R. Carpenter,[6] Wim de Vries,[7,8] Cynthia A. de Wit,[9] Carl Folke,[1,10] Dieter Gerten,[11] Jens Heinke,[11,12,13] Georgina M. Mace,[14] Linn M. Persson,[15] Veerabhadran Ramanathan,[16,17] Belinda Reyers,[1,18] Sverker Sörlin[19]

http://www.anthropocene.info/index.php



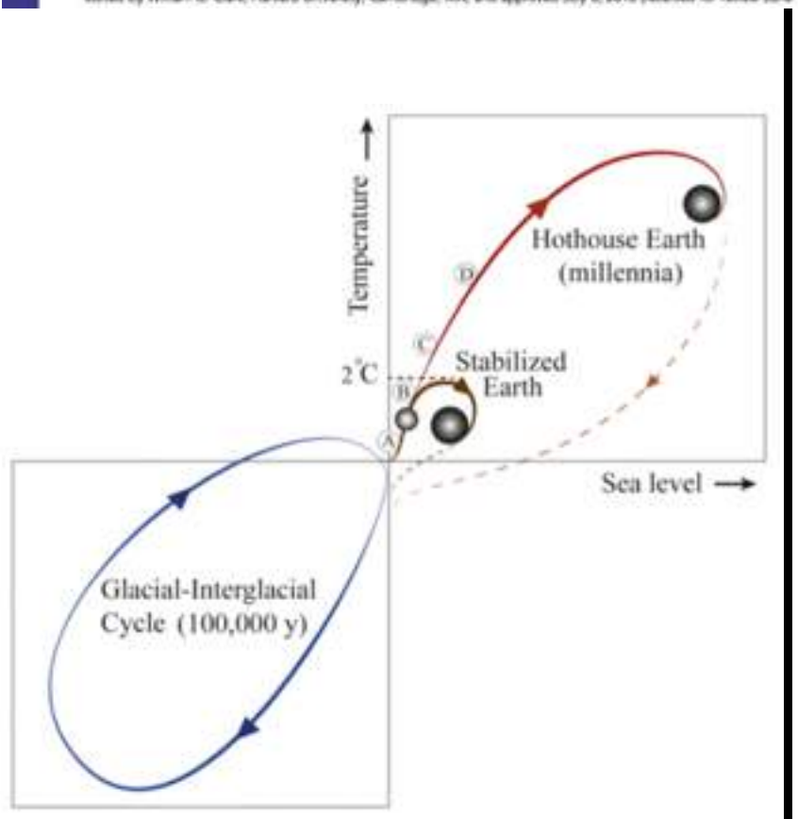
BASES CONCEITUAIS

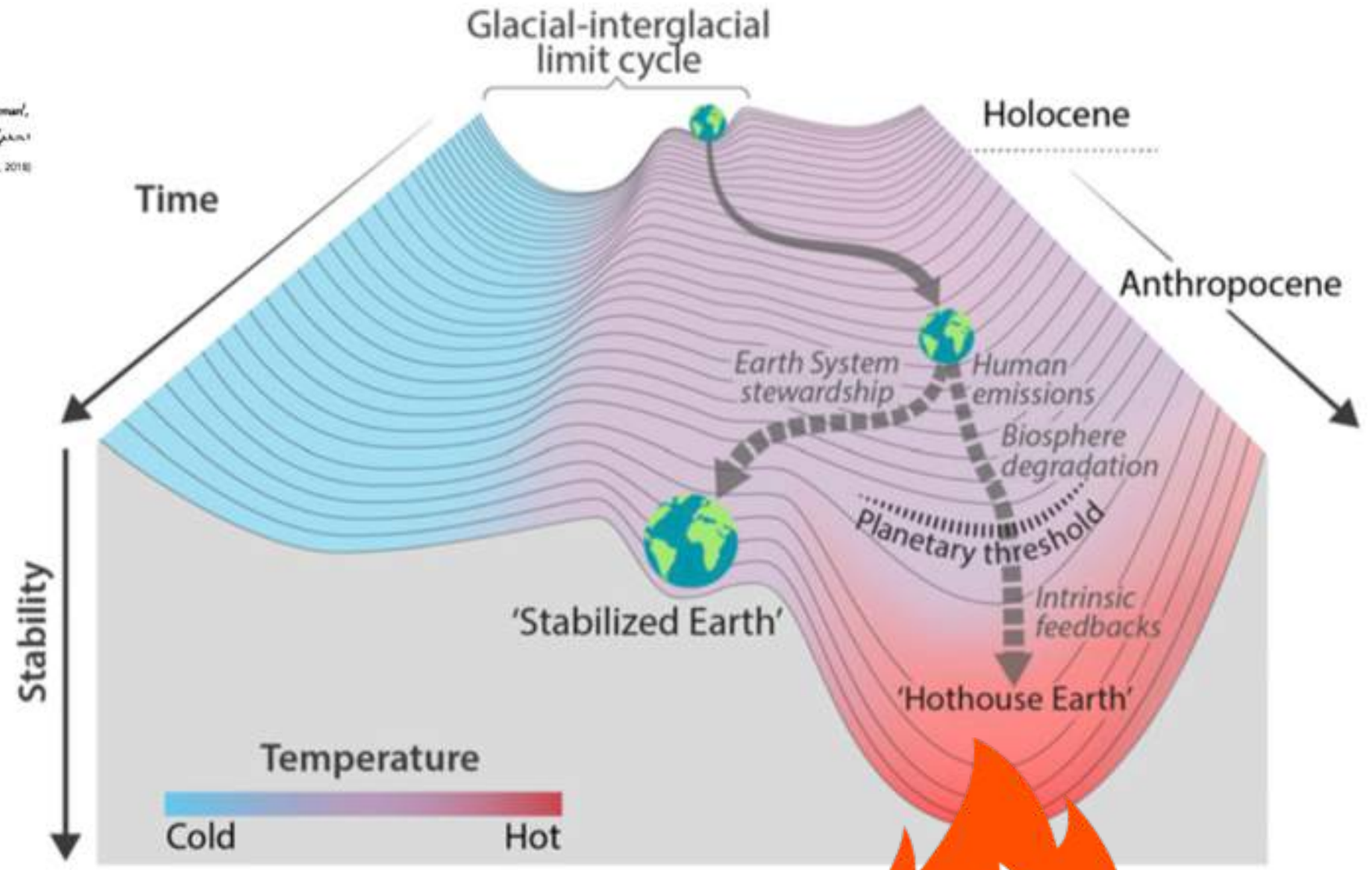
PNAS

Trajectories of the Earth System in the Anthropocene

Will Steffen[a,b,1], Johan Rockström[c], Katherine Richardson[d], Timothy M. Lenton[e], Carl Folke[a,f], Diana Liverman[g], Colin P. Summerhayes[h], Anthony D. Barnosky[i], Sarah E. Cornell[e], Michel Crucifix[j], Jonathan F. Donges[a,k], Ingo Fetzer[a], Steven J. Lade[a,b], Marten Scheffer[l], Ricarda Winkelmann[a,m], and Hans Joachim Schellnhuber[a,b,n,1]

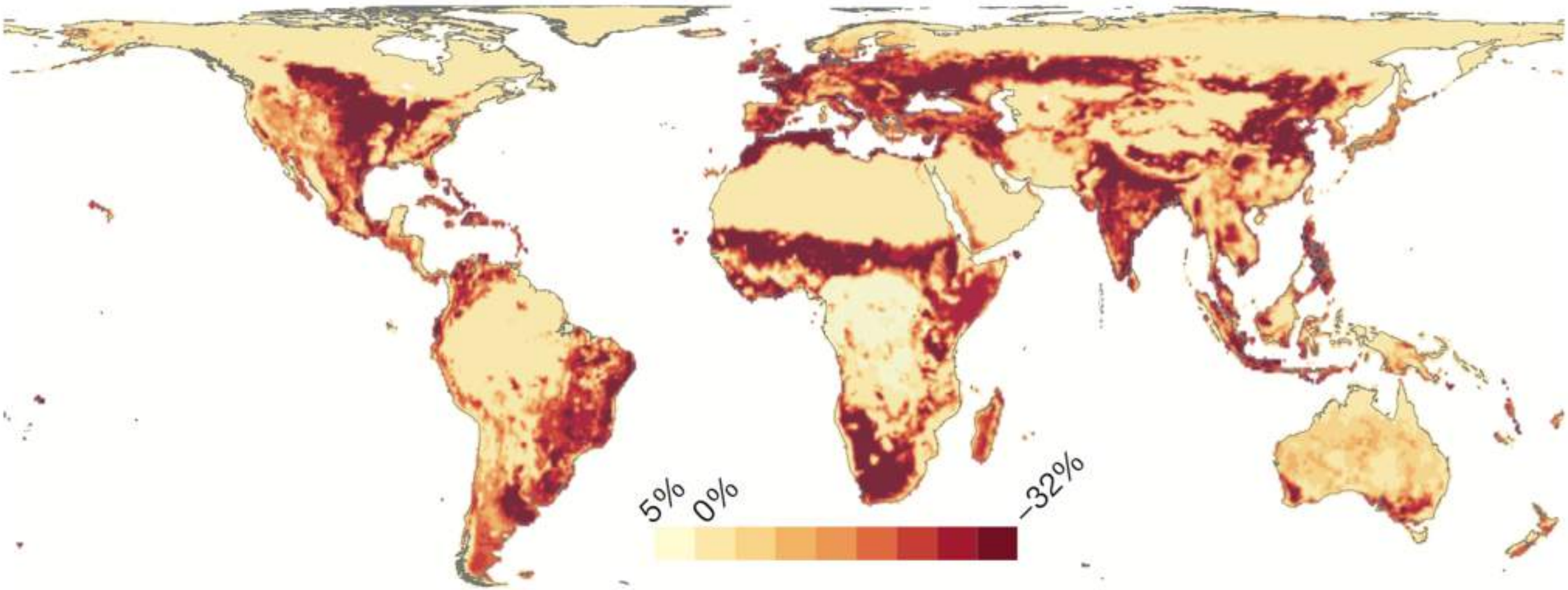
Edited by William C. Clark, Harvard University, Cambridge, MA, and approved July 6, 2018 (received for review June 19, 2018)





MUDANÇAS DE USO E COBERTURA DO SOLO

O TAMANHO DO PROBLEMA



ARTICLE

doi:10.1038/nature14324

Global effects of land use on local terrestrial biodiversity

Tim Newbold[1,2]*, Lawrence N. Hudson[2]*, Samantha L. L. Hill[1,2], Sara Contu[2], Igor Lysenko[2], Rebecca A. Senior[2]†, Luca Börger[3], Dominic J. Bennett[2]†, Argyrios Choimes[2,4], Ben Collen[5], Julie Day[2]†, Adriana De Palma[2,3], Sandra Díaz[6], Susy Echeverria-Londoño[3], Melanie J. Edgar[2], Anat Feldman[5], Morgan Garon[3], Michelle L. K. Harrison[2], Tamera Alhusseini[2], Daniel J. Ingram[2]†, Yuval Itescu[5], Jens Kattge[7,22], Victoria Kemp[2], Lucinda Kirkpatrick[2]†, Michael Kleyer[23], David Laginha Pinto Correia[3], Callum D. Martin[2], Shai Meiri[8], Maria Novosolov[8], Yuan Pan[2], Helen R. P. Phillips[3,9], Drew W. Purves[2], Alexandra Robinson[2], Jake Simpson[2], Sean L. Tuck[2,5], Evan Weber[2,3], Hannah J. White[2]†, Robert M. Ewers[2], Georgina M. Mace[5], Jörn P. W. Scharlemann[2,10] & Andy Purvis[2,5]

PERDA DE BIODIVERSIDADE

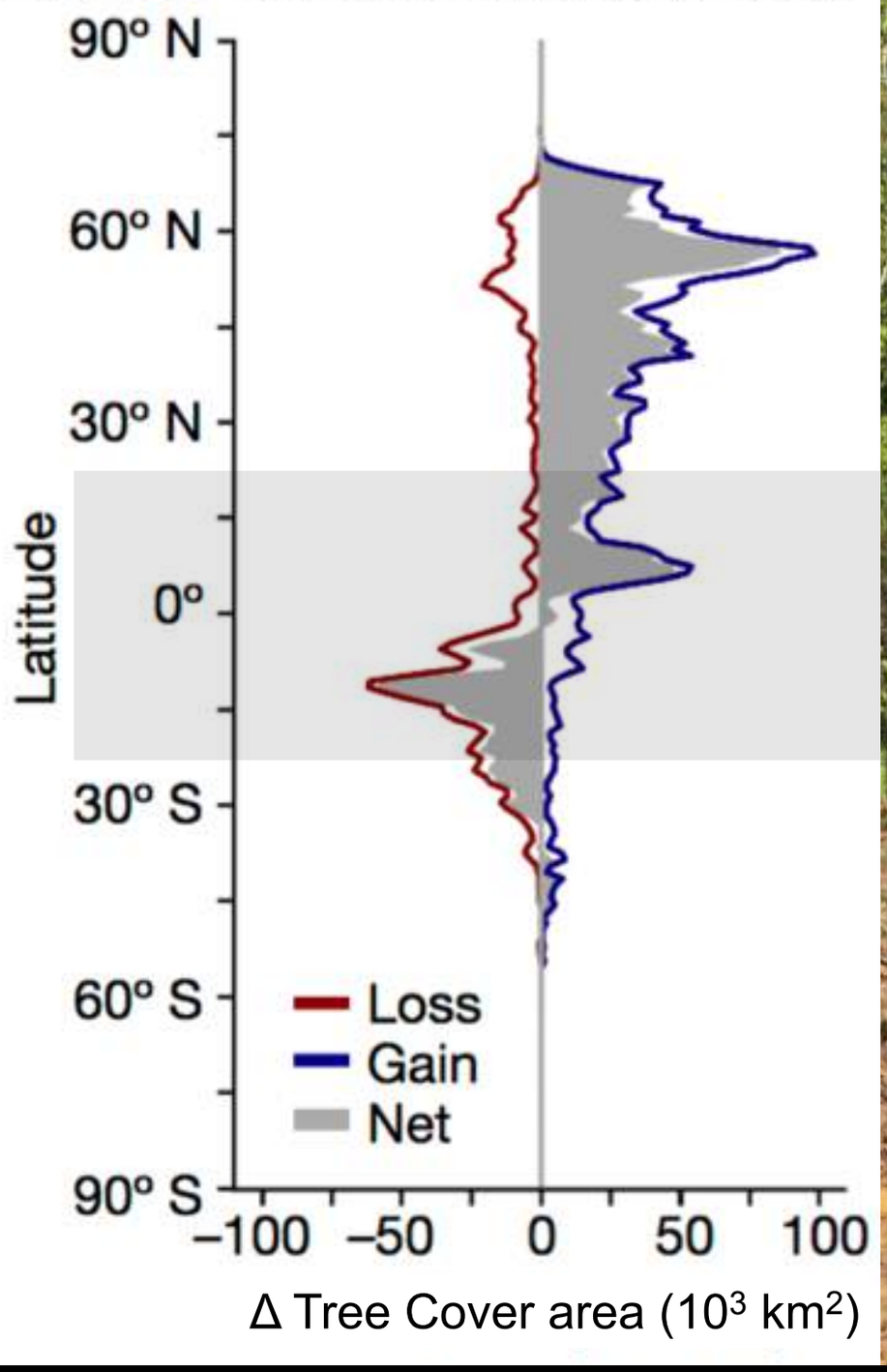
BASES CONCEITUAIS

LETTER

https://doi.org/10.1038/s41586-018-0411-9

Global land change from 1982 to 2016

Xiao-Peng Song[1]*, Matthew C. Hansen[1], Stephen V. Stehman[2], Peter V. Potapov[1], Alexandra Tyukavina[1], Eric F. Vermote[3] & John R. Townshend[1]

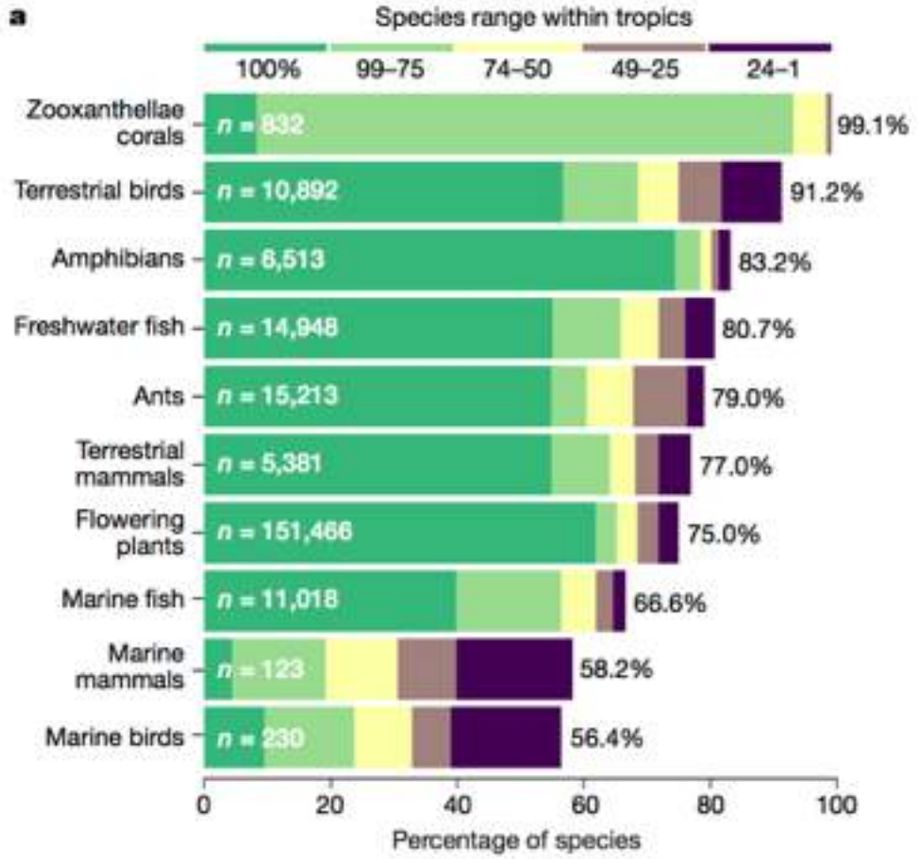


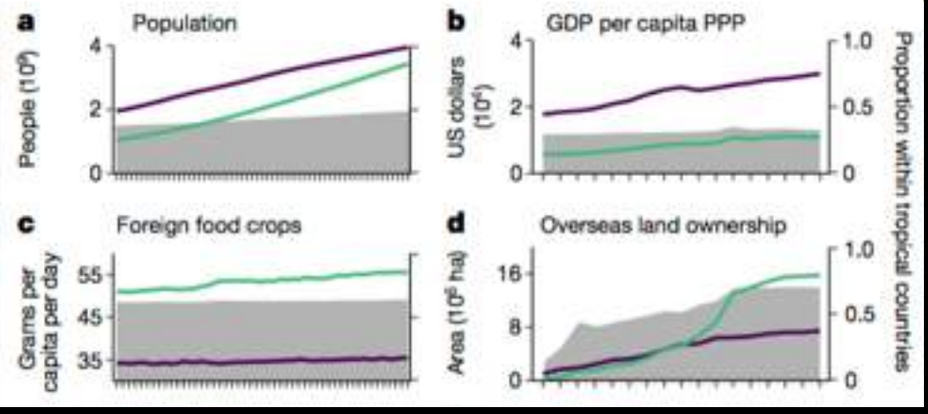
REVIEW

https://doi.org/10.1038/s41586-018-0301-1

The future of hyperdiverse tropical ecosystems

Jos Barlow[1]*, Filipe França[1,2], Toby A. Gardner[3], Christina C. Hicks[4], Gareth D. Lennox[1], Erika Berenguer[1,5], Leandro Castello[6], Evan P. Economo[7], Joice Ferreira[8], Benoit Guénard[9], Cecília Gontijo Leal[8], Victoria Isaac[8], Alexander C. Lees[10], Catherine L. Parr[11,12,13], Shaun K. Wilson[14,15], Paul J. Young[1] & Nicholas A. J. Graham[1]





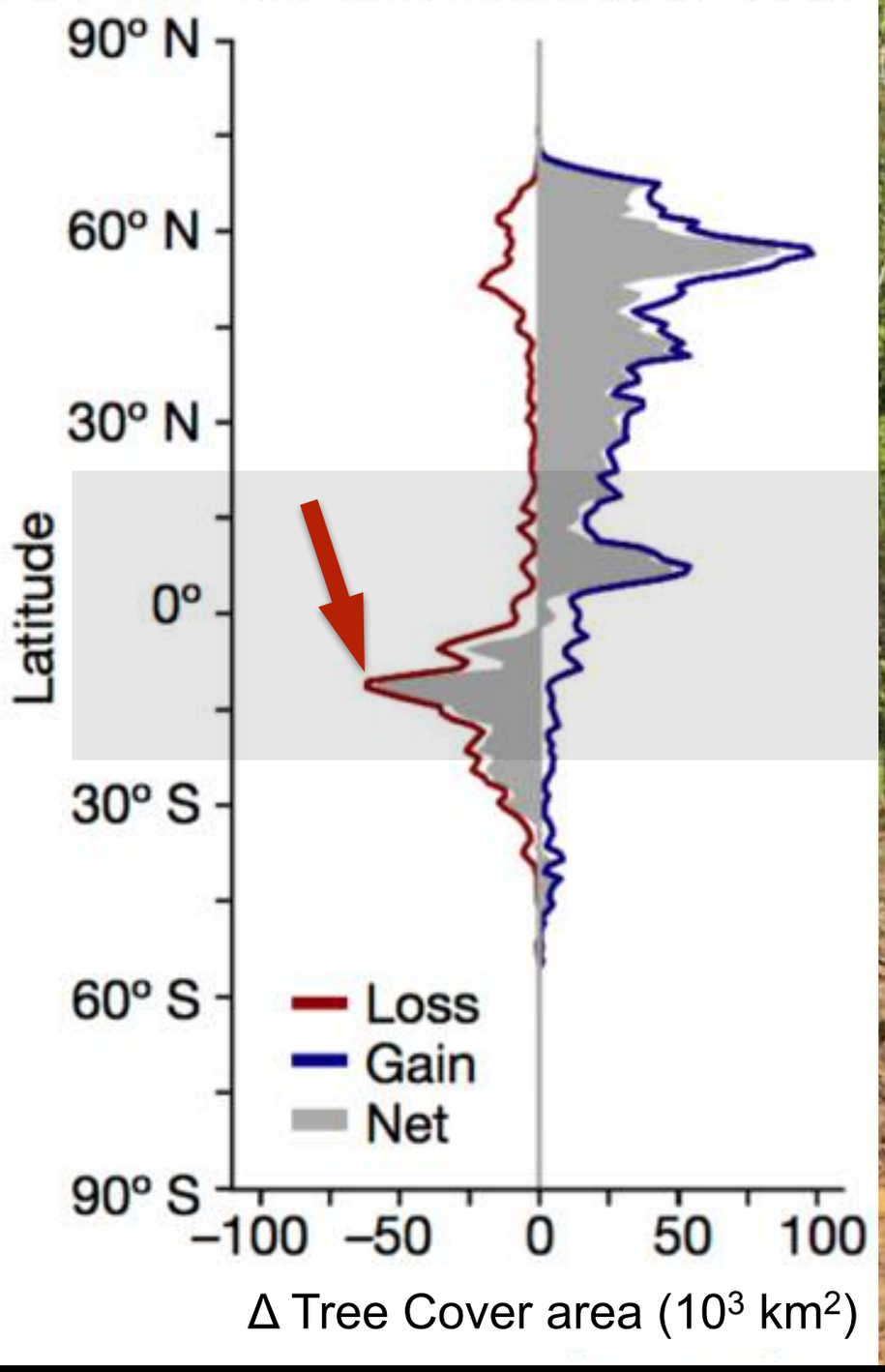
BASES CONCEITUAIS

LETTER

https://doi.org/10.1038/s41586-018-0411-9

Global land change from 1982 to 2016

Xiao-Peng Song[1]*, Matthew C. Hansen[1], Stephen V. Stehman[2], Peter V. Potapov[1], Alexandra Tyukavina[1], Eric F. Vermote[3] & John R. Townshend[1]

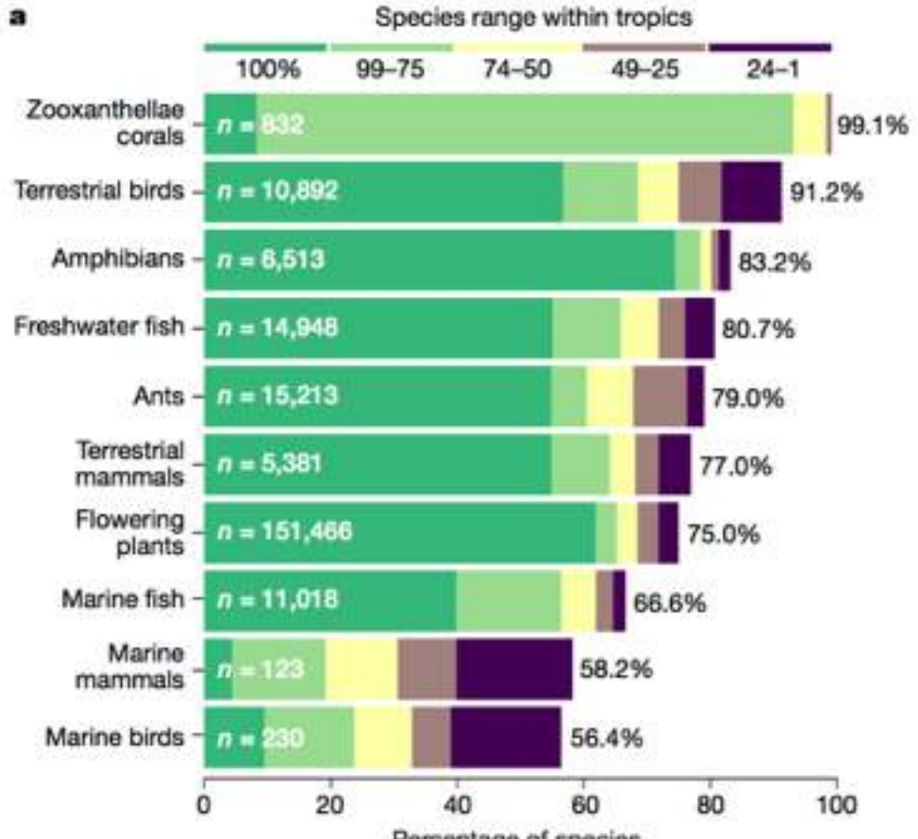


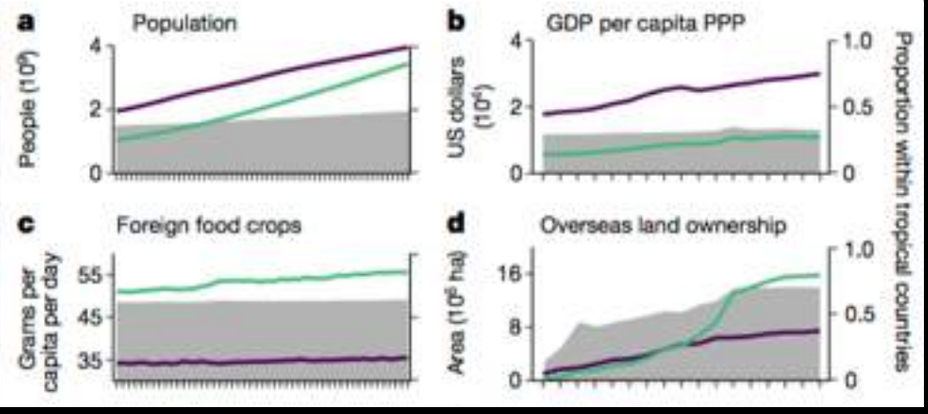
REVIEW

https://doi.org/10.1038/s41586-018-0301-1

The future of hyperdiverse tropical ecosystems

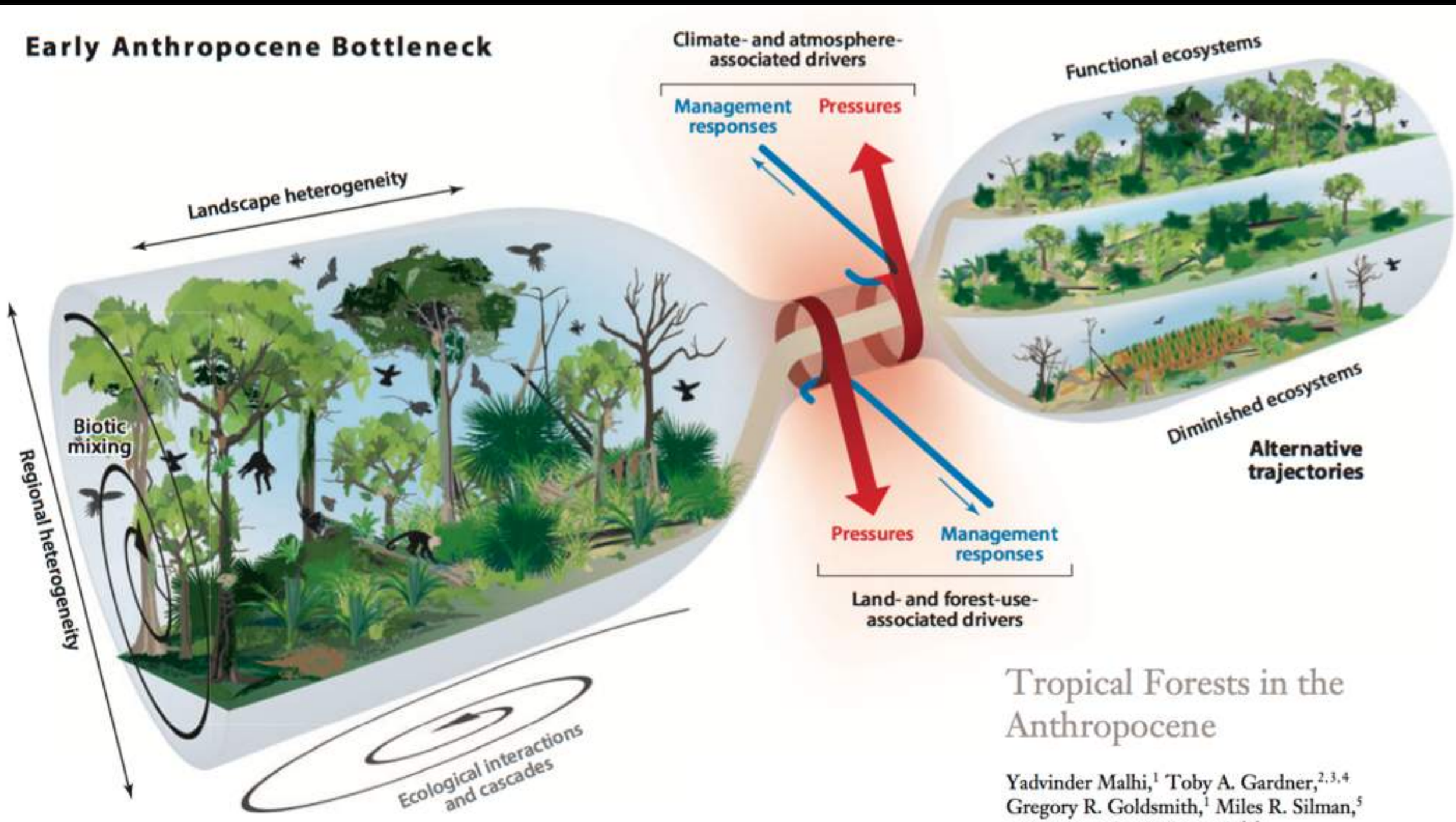
Jos Barlow[1]*, Filipe França[1,2], Toby A. Gardner[3], Christina C. Hicks[4], Gareth D. Lennox[1], Erika Berenguer[1,5], Leandro Castello[6], Evan P. Economo[7], Joice Ferreira[8], Benoit Guénard[9], Cecília Gontijo Leal[8], Victoria Isaac[8], Alexander C. Lees[10], Catherine L. Parr[11,12,13], Shaun K. Wilson[14,15], Paul J. Young[1] & Nicholas A. J. Graham[1]





HOMOGENEIZAÇÃO BIÓTICA

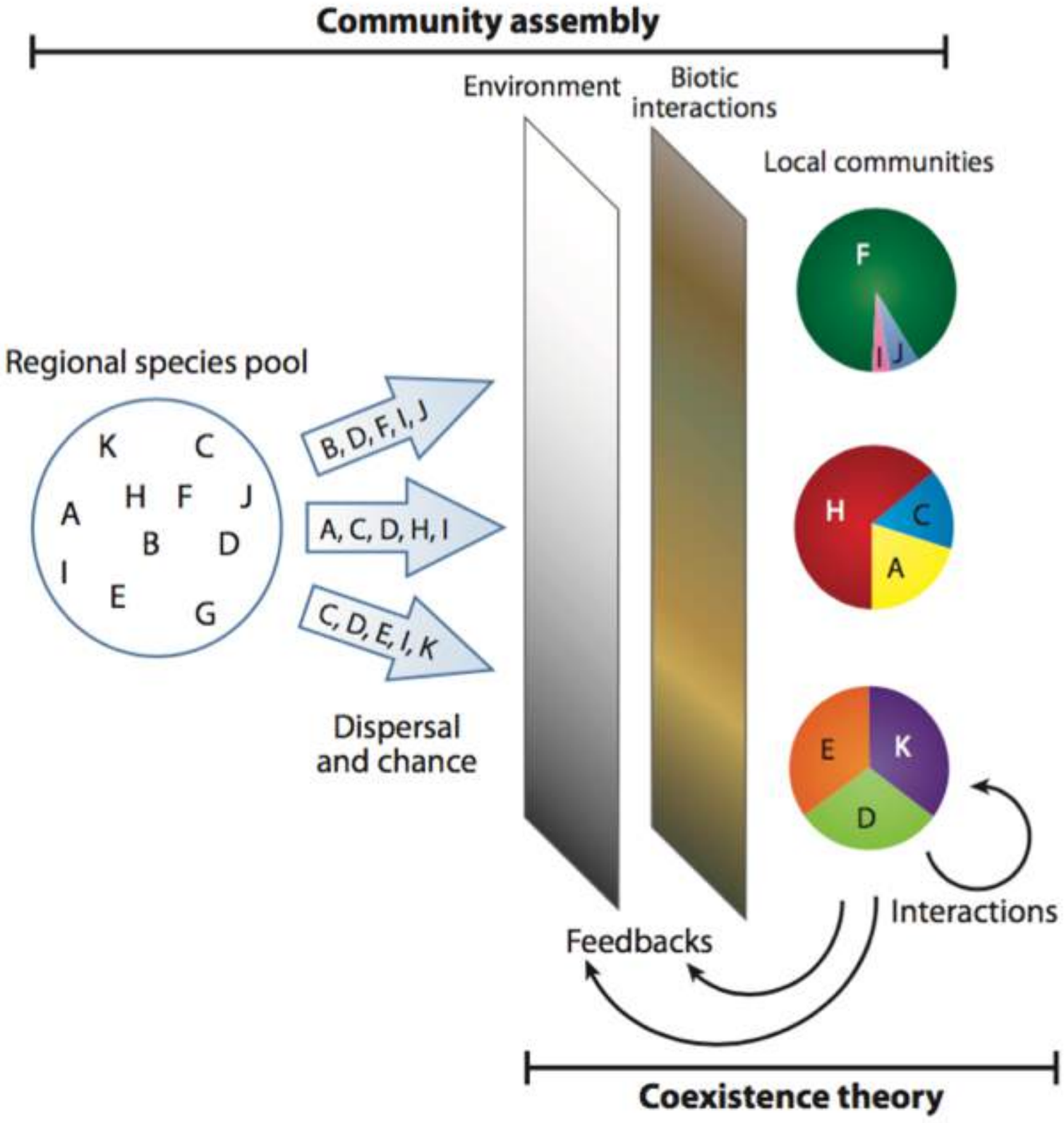
BASES CONCEITUAIS



Tropical Forests in the Anthropocene

Yadvinder Malhi,[1] Toby A. Gardner,[2,3,4] Gregory R. Goldsmith,[1] Miles R. Silman,[5] and Przemyslaw Zelazowski[1,6]

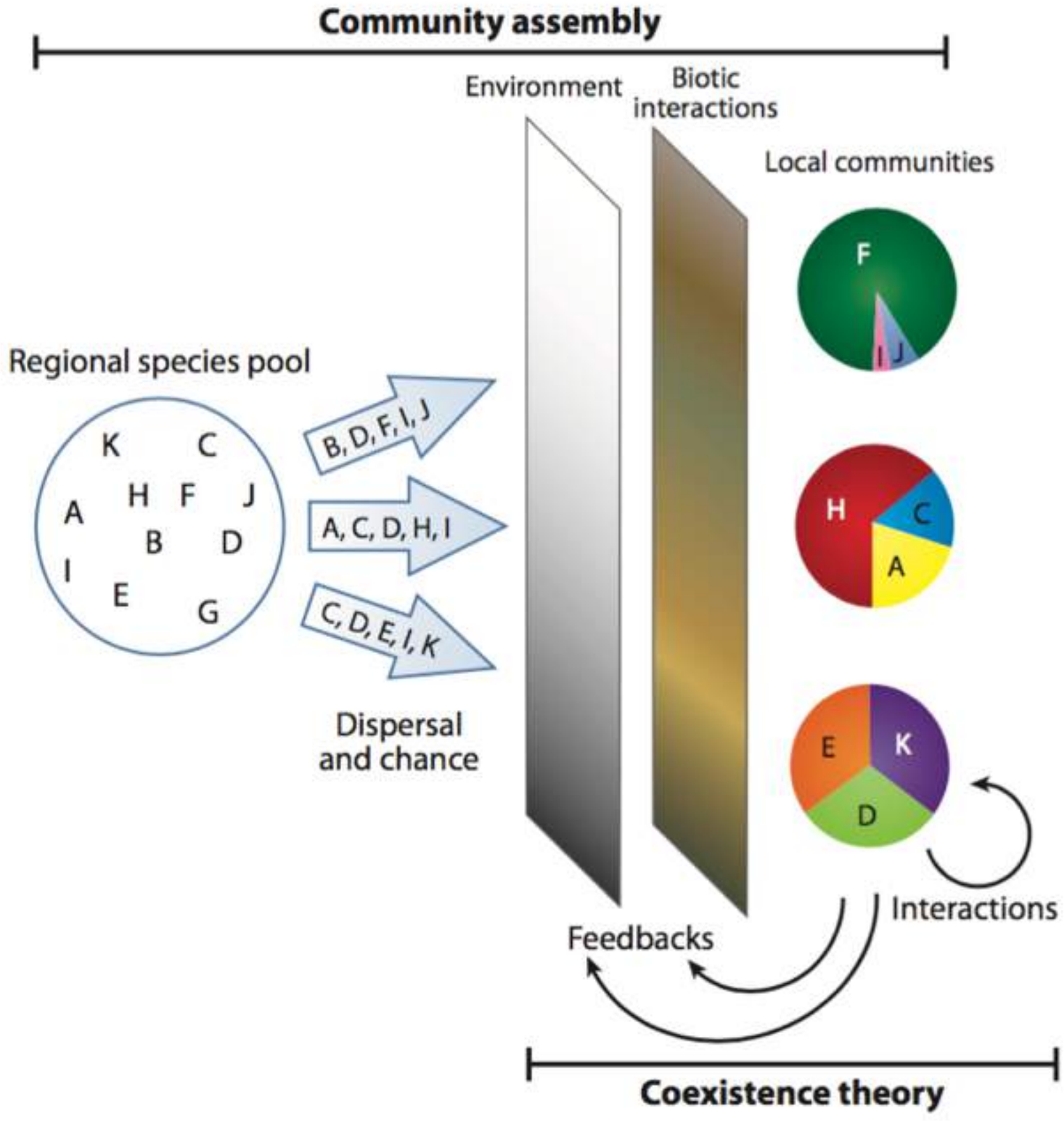
ESCALAS ESPACIAIS E TEMPORAIS



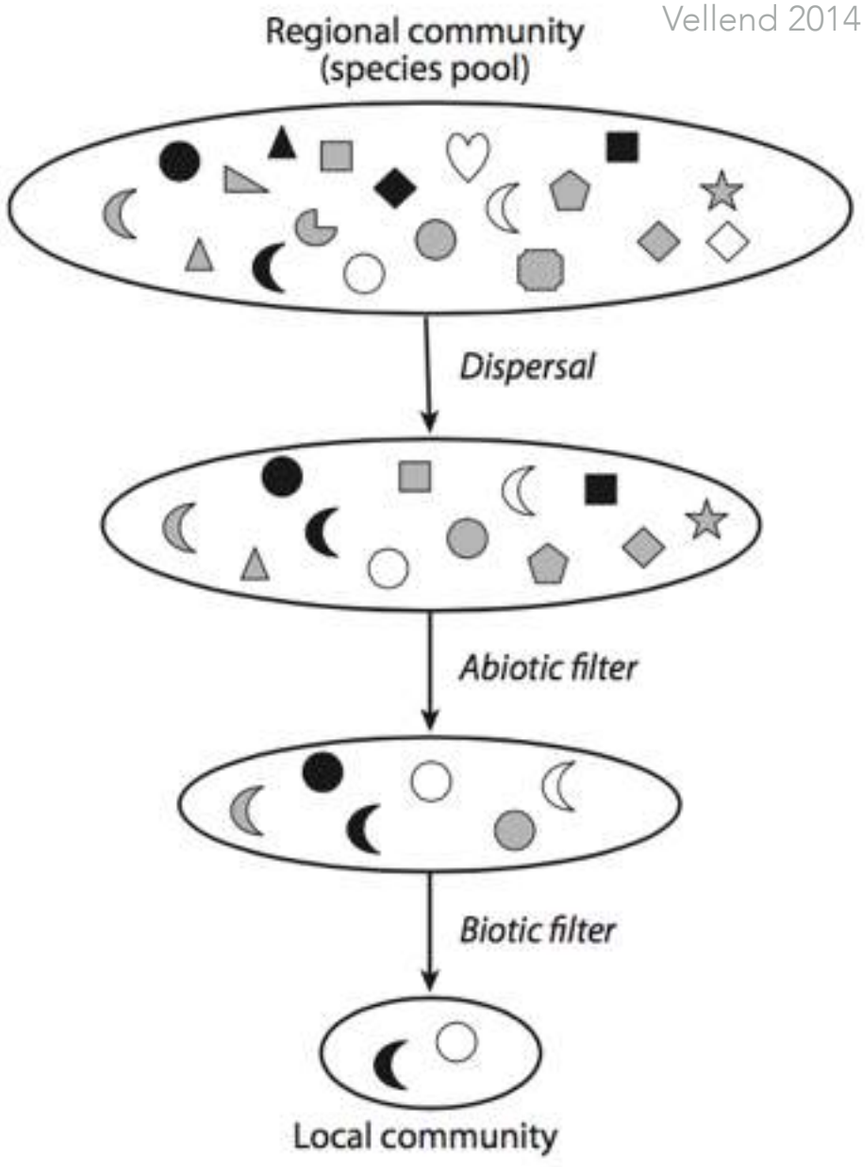
Rethinking Community Assembly through the Lens of Coexistence Theory

J. HilleRisLambers,[1] P.B. Adler,[2] W.S. Harpole,[3] J.M. Levine,[4] and M.M. Mayfield[5]

BASES CONCEITUAIS



Vellend 2014

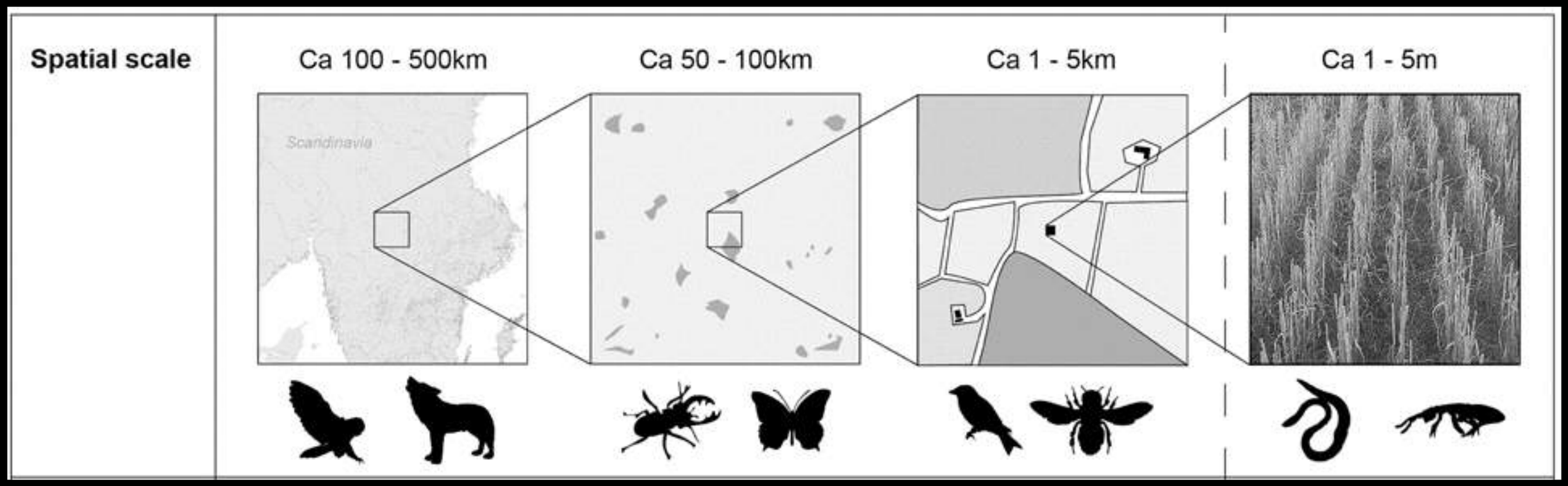


Rethinking Community Assembly through the Lens of Coexistence Theory

J. HilleRisLambers,[1] P.B. Adler,[2] W.S. Harpole,[3] J.M. Levine,[4] and M.M. Mayfield[5]

COMUNIDADES ECOLÓGICAS VARIAM NO ESPAÇO E TEMPO

- Múltiplas escalas espaciais e temporais
  - Diferentes padrões e estratégias
  - Quais são os processos ecológicos?



TÓPICOS ABORDADOS

- Bem vindo ao Antropoceno
- Bases conceituais & Processos Ecológicos
    - Mudanças globais
    - Limites planetários
    - A importância dos ambientes tropicais
- **Conclusões e perspectivas**

Mensagens para levar para casa

- O Antropoceno é uma **nova época geológica**, caracterizada pela **dominância das ações antrópicas** como **força modificadora** do planeta

- Diversos **processos ecológicos** estão envolvidos. Nossa **habilidade em entendê-los e manejá-los** será **decisiva para o futuro do planeta**.

- **Não existe uma bala de prata** - somente iniciativas e projetos multidisciplinares serão capazes de tatear o problema

Obrigado

ricardosolar@ufmg.br

@bob_solar

UFMG

UNIVERSIDADE FEDERAL DE MINAS GERAIS

ECMVS

FUNDEP

Fundação de Desenvolvimento da Pesquisa

CEMIG

ANEEL

AGÊNCIA NACIONAL DE ENERGIA ELÉTRICA

P&D - PROGRAMA DE PESQUISA E DESENVOLVIMENTO

GT 599

CAPES

CNPq

Conselho Nacional de Desenvolvimento Científico e Tecnológico