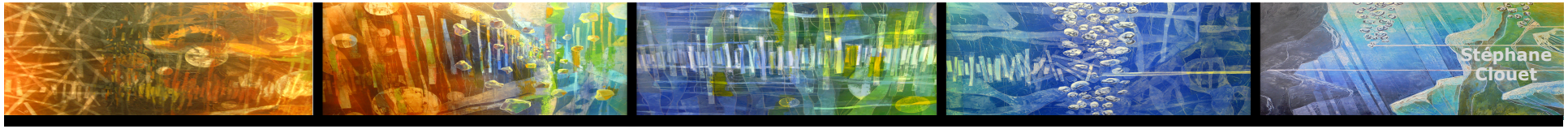


limites d'adaptation des systèmes humains

jean-françois toussaint

université paris descartes
insep, ap-hp
irmes

JE SUIS CHARLIE

Collège de France, 2014:
http://www.college-de-france.fr/site/gilles-boeuf/symposium-2014-05-23-12h00.htm
.
http://www.college-de-france.fr/site/gilles-boeuf/seminar-2014-02-11-10h00.htm

Antony
1er décembre 2016

PARIS
Ville candidate
Jeux Olympiques de 2024

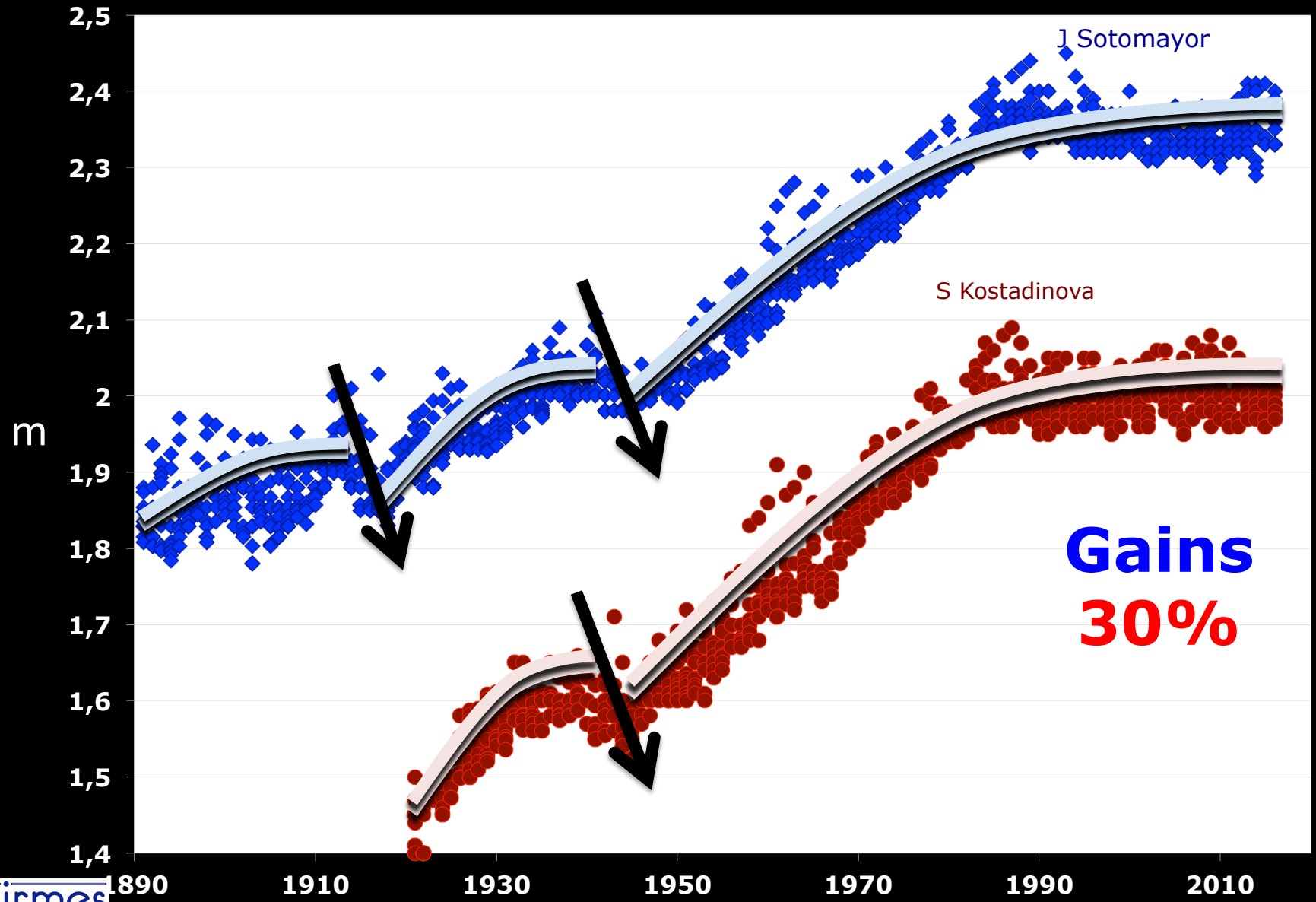
Haut Conseil de la Santé Publique
ASSISTANCE PUBLIQUE HÔPITAUX DE PARIS
irmes
institut de recherche biomédicale et d'épidémiologie du sport
UNIVERSITÉ PARIS DESCARTES
INSEP Terre de Champions
Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE
MINISTÈRE DE LA VILLE, DE LA JEUNESSE ET DES SPORTS

ce n’est pas la réalité
qui nous trompe

mais son
interprétation

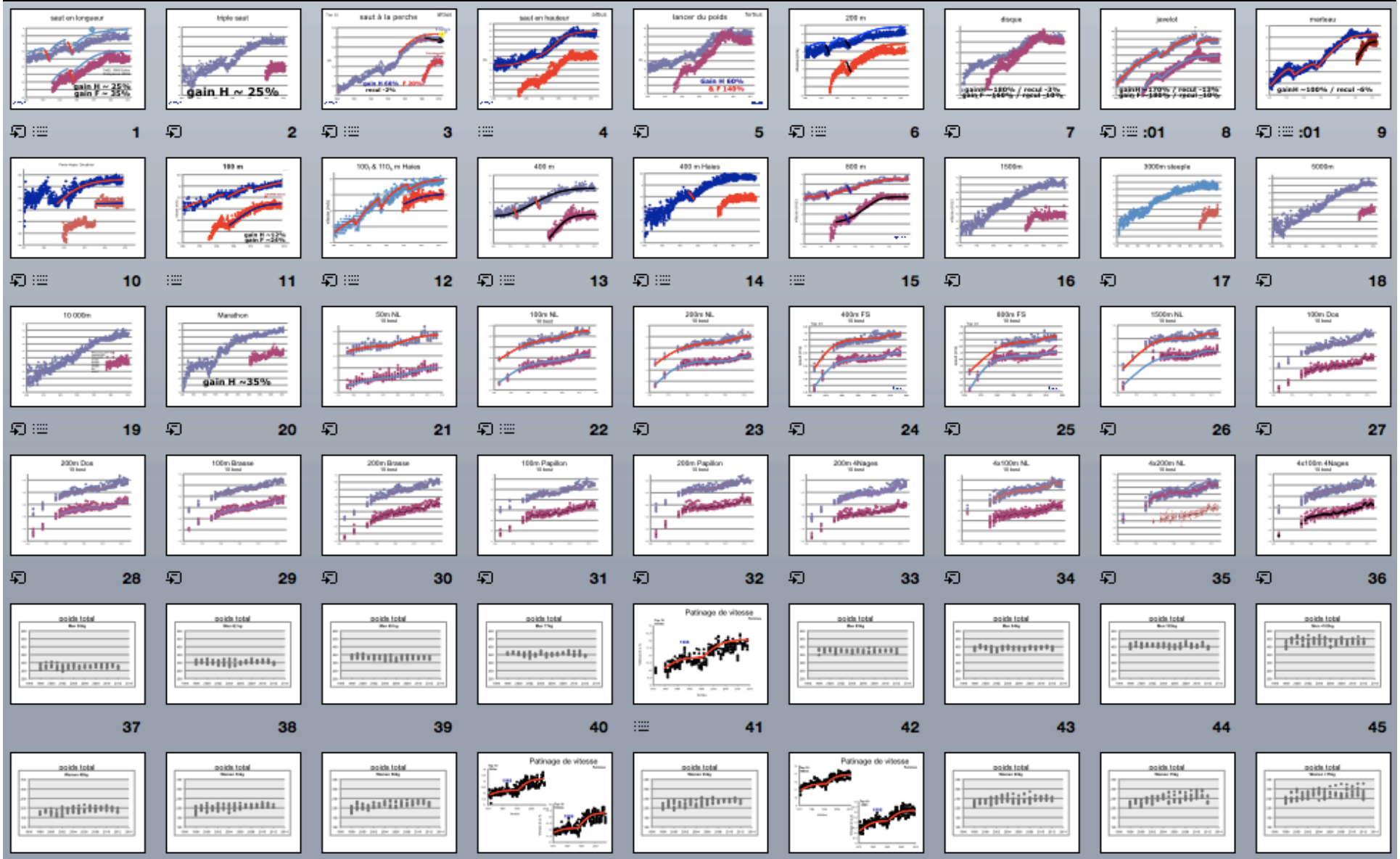
hauteur

Top 10



irmes

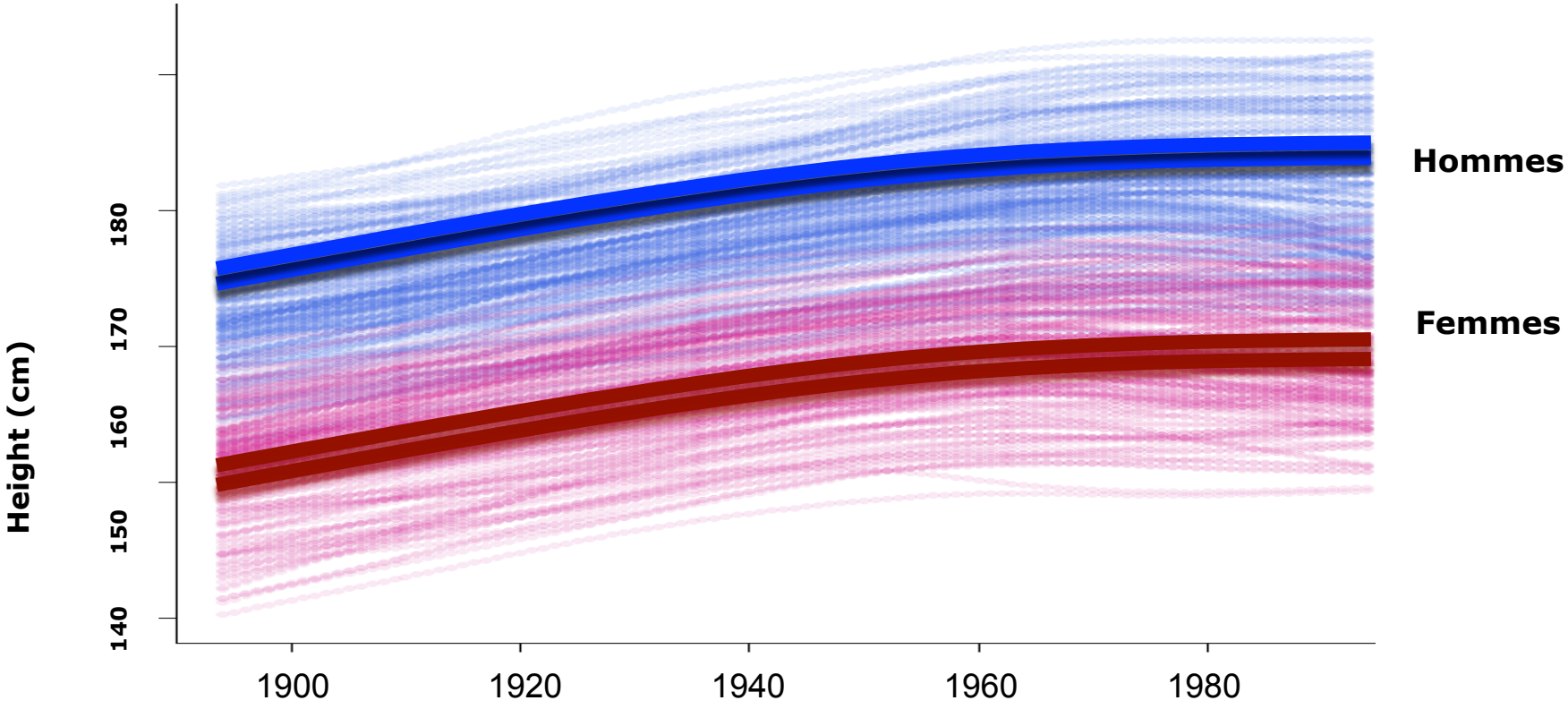
athlétisme - natation - cyclisme - haltérophilie



G. Berthelot, *PLoS ONE* 2010

taille adulte

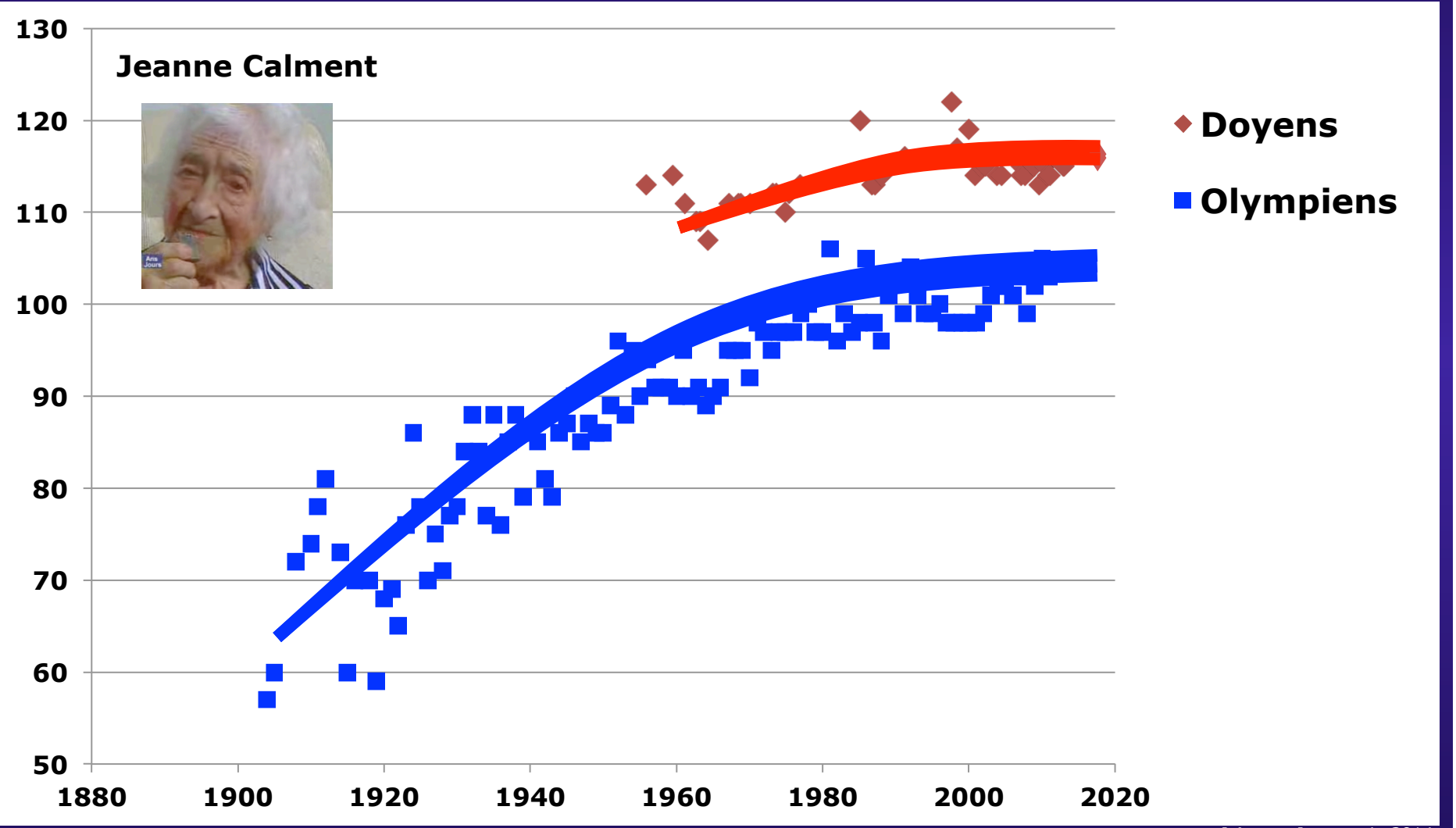
200 pays



année de naissance

A century of trends in adult human height
NCD Risk Factor Collaboration 2016
eLife. 5: e13410 doi: 10.7554/eLife.13410

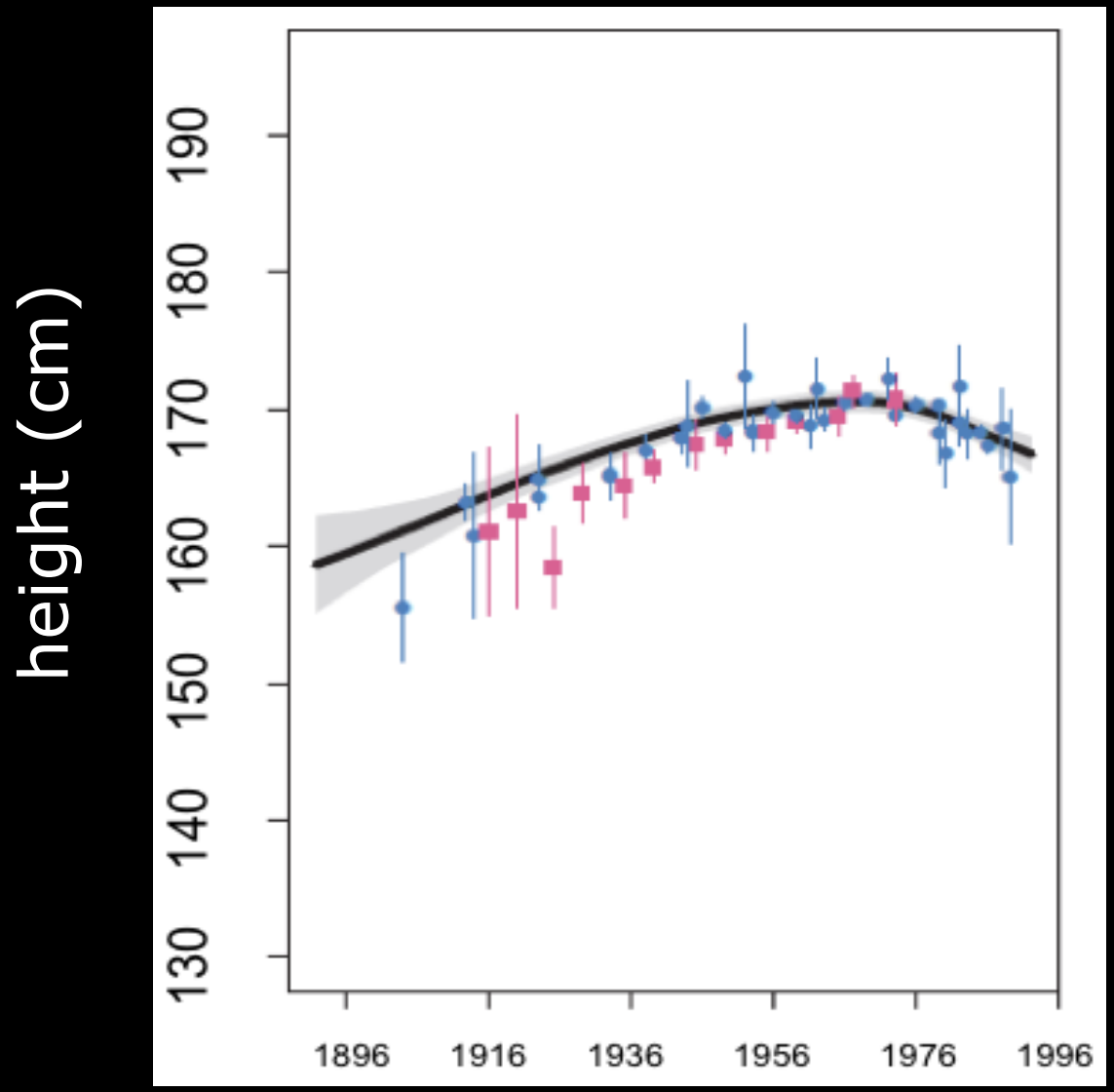
durée de vie
maximale



J Antero-Jacquemin 2014
J Gerontol A Biol Sci Med Sci
doi:10.1093/gerona/glu130

irmes
institut de recherche biomédicale et d'épidémiologie du sport

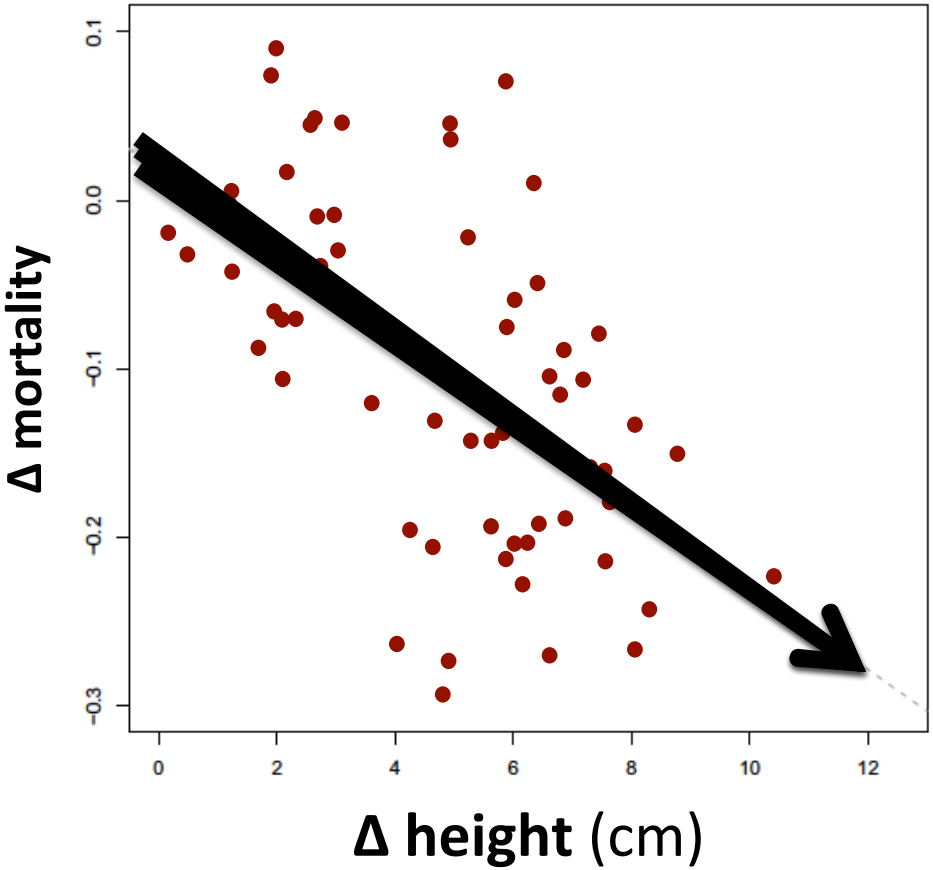
taille
Egypte



A century of trends in adult human height
NCD Risk Factor Collaboration 2016
eLife. 5: e13410 doi: 10.7554/eLife.13410

Δ Taille & Mortalité

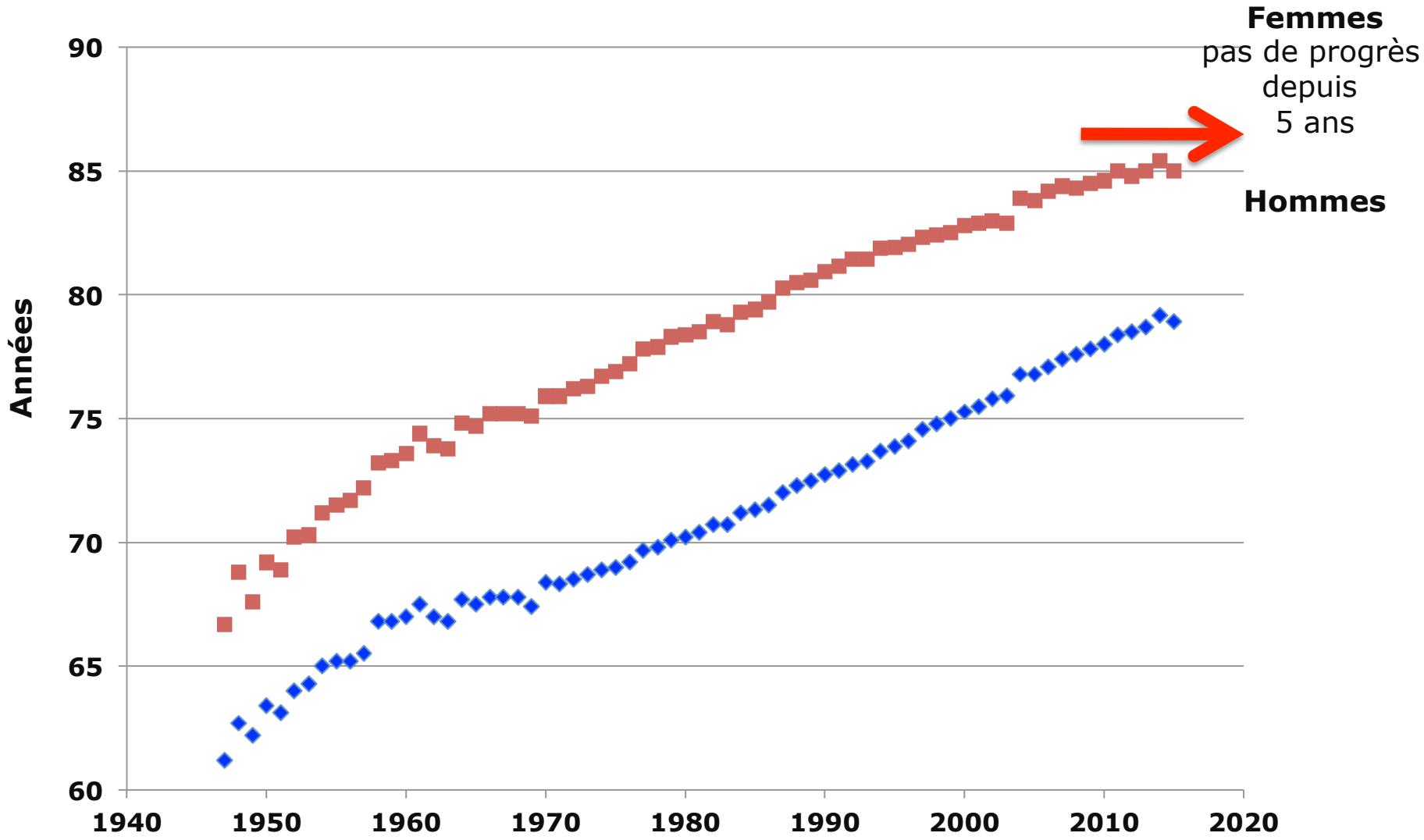
Monde



A century of trends in adult human height
NCD Risk Factor Collaboration 2016
eLife. 5: e13410 doi: 10.7554/eLife.13410

espérance de vie

France 2016



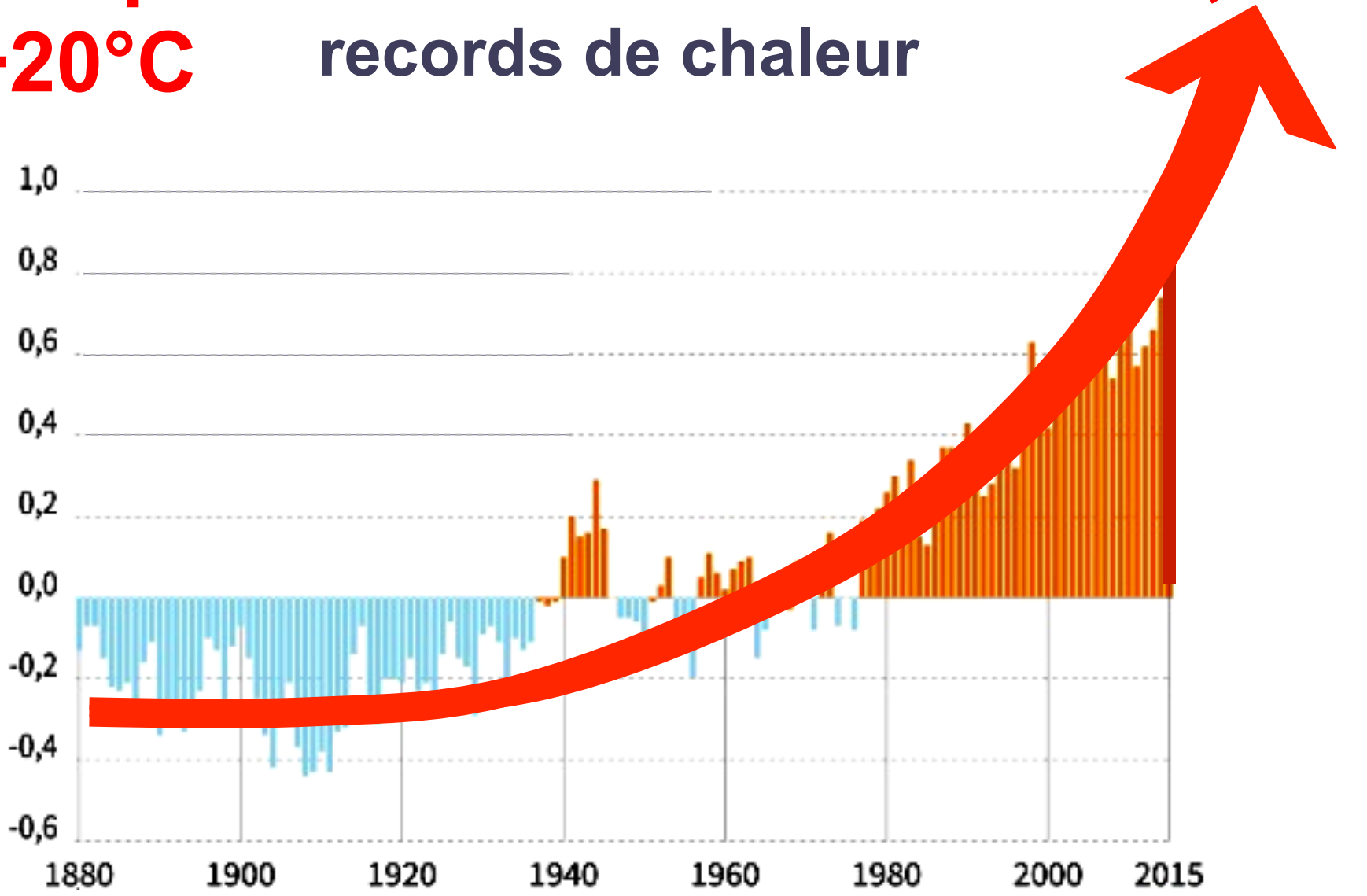
INED, INSEE
Janvier 2016

Pison G, 2016
Population & Sociétés
n°531, mars

arctique +20°C

2014 2015 2016 +1,2°C

records de chaleur



Source NOAA

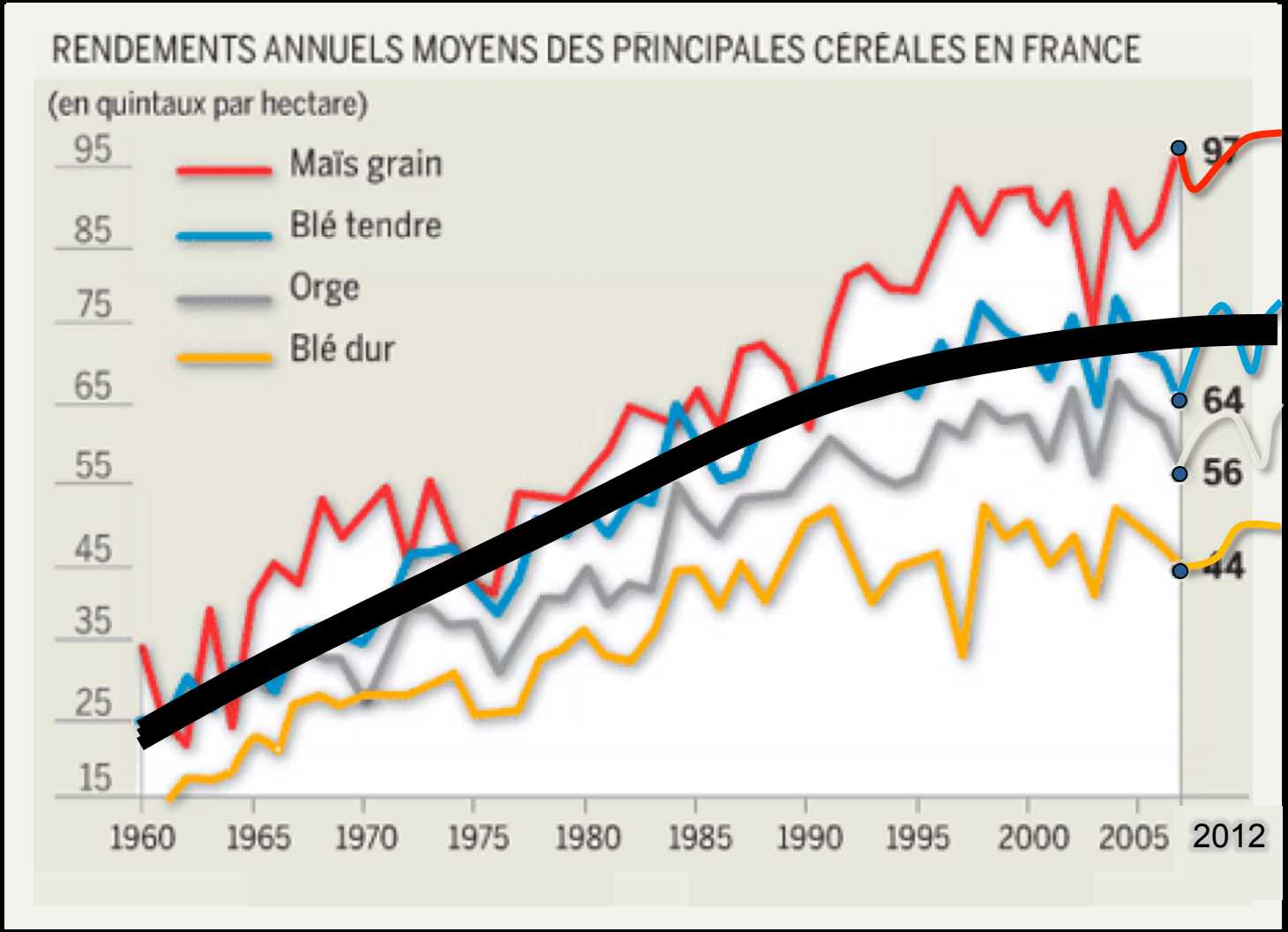
Londres +4°C

http://choices.climatecentral.org

New York +1°C

Sandy, 22 oct 2012

rendements céréaliers



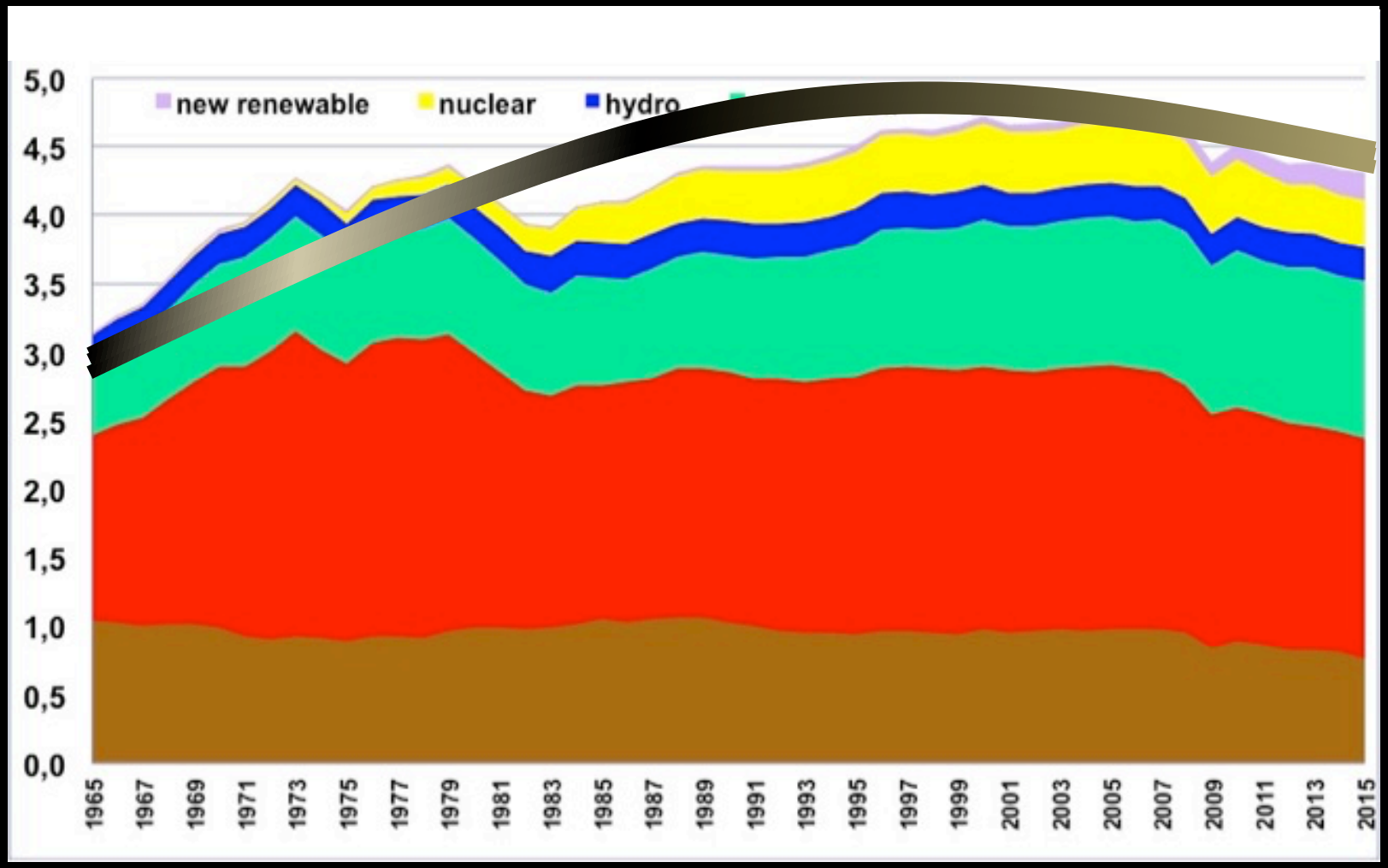
Ray DK, 2012
Nature Comm 3, 1293
doi: 10.1038/ncomms2296

yield stagnation depuis 20 ans

Agristat, *Agreste* 2009
B Seguin, *INRA* 2010

énergie per capita

OCDE 1900-2015

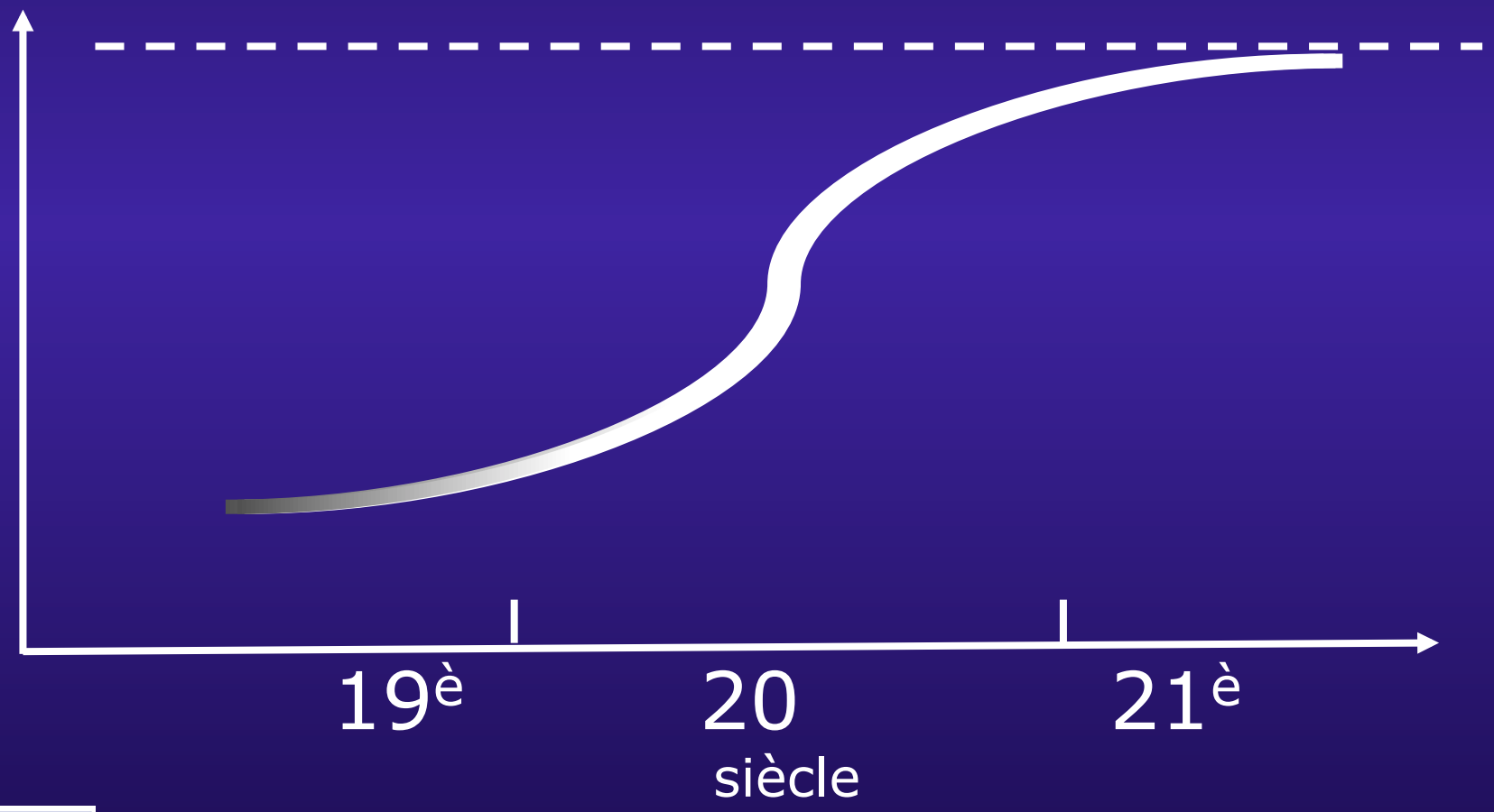


Consommation annuelle

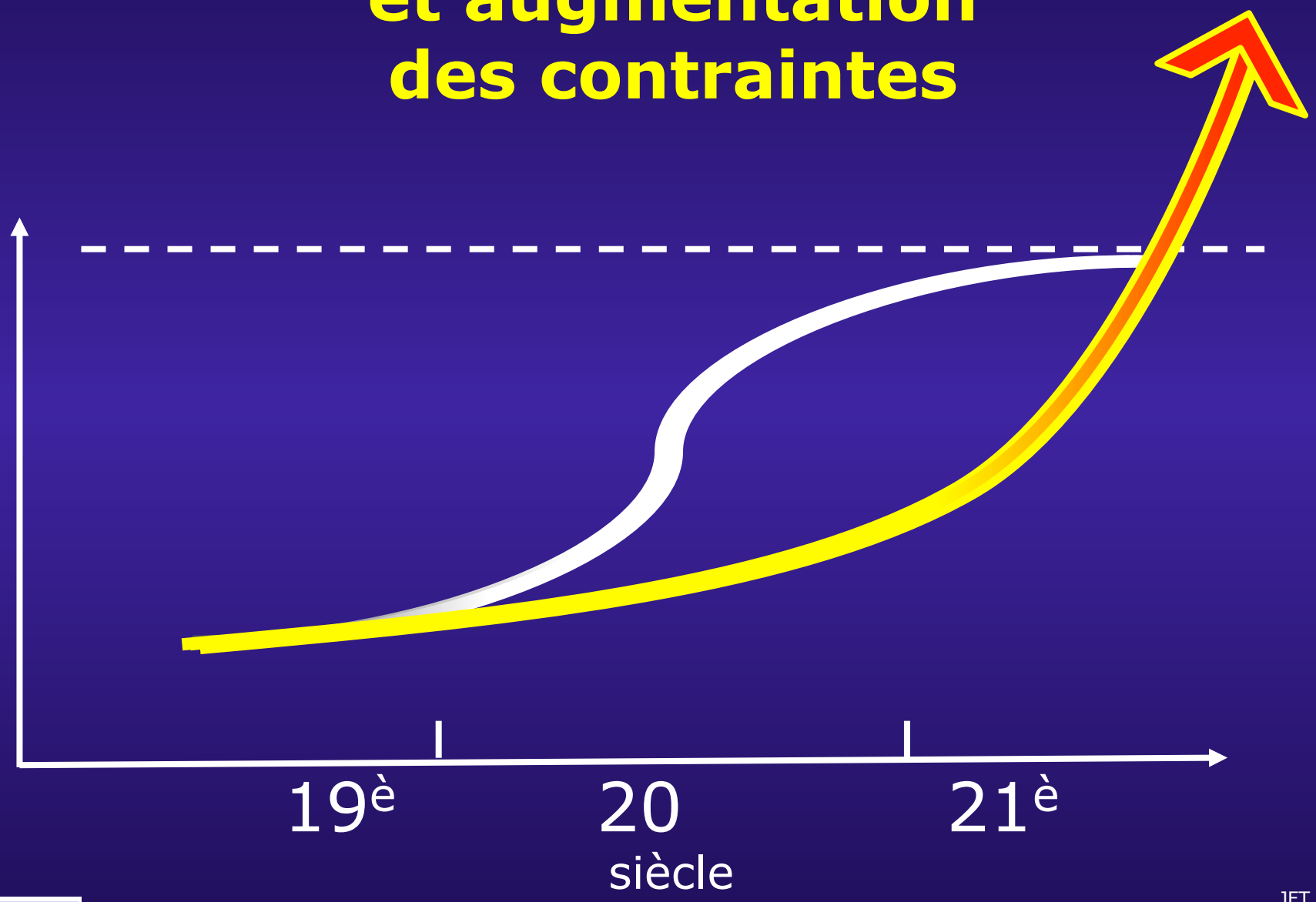
http://www.manicore.com/documentation/transition_energie.html

IEA World Outlook, BP Satistical Review & UN 2016

optimisation de croissance



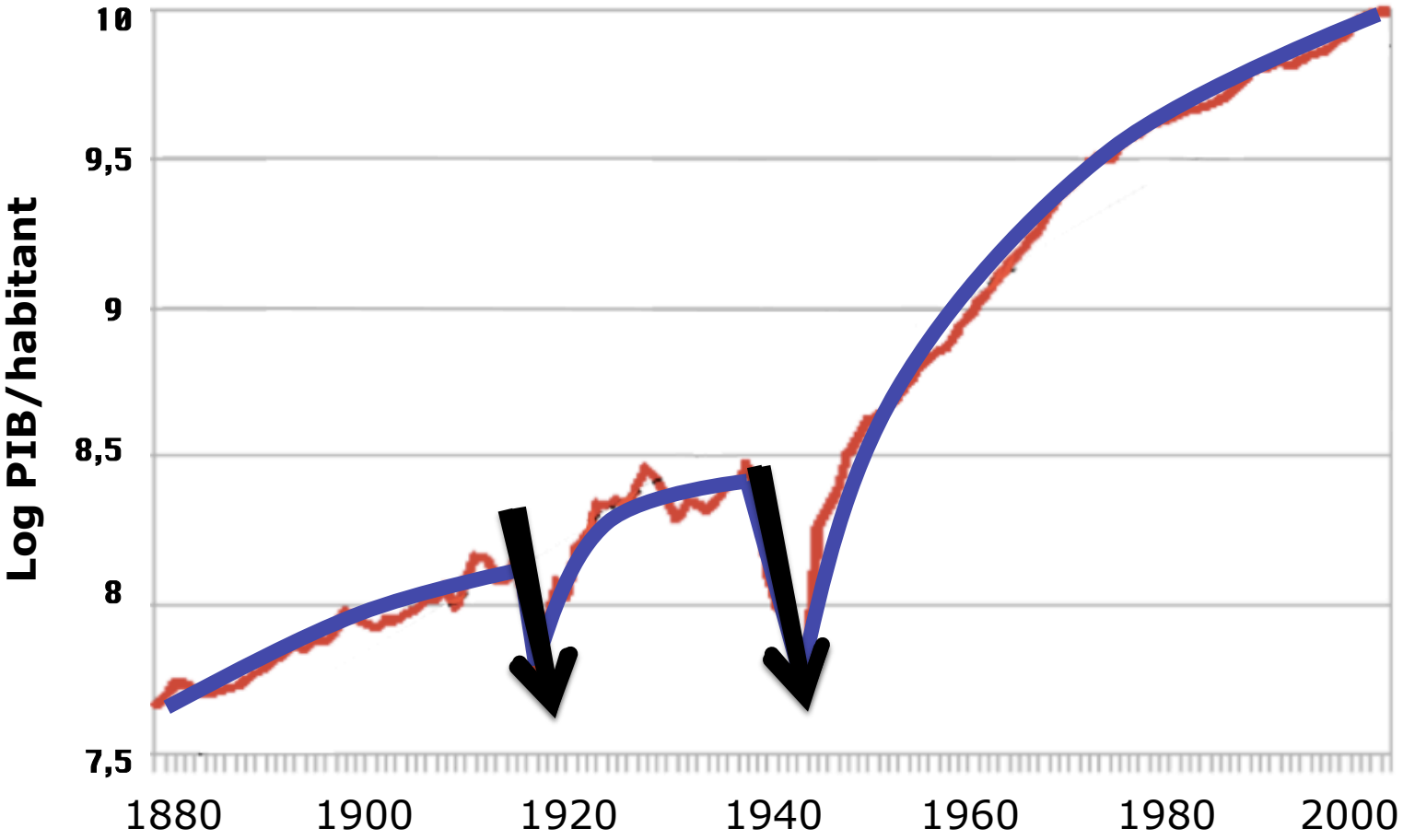
optimisation de croissance
et augmentation
des contraintes



expansion et limites économiques

optimisation des potentiels

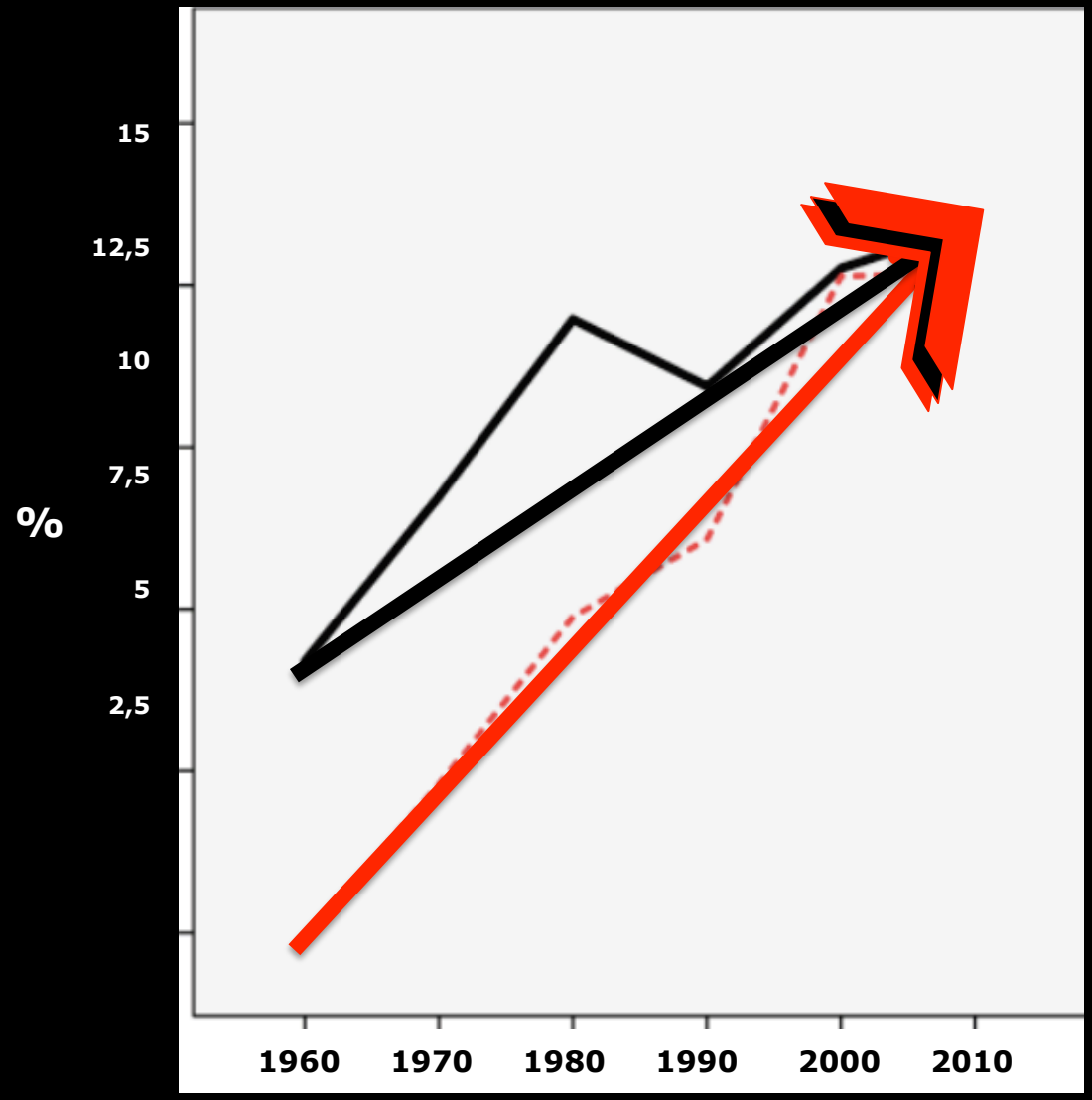
taux de croissance du PIB



Minefi
2008

score des partis populistes

24 pays Européens



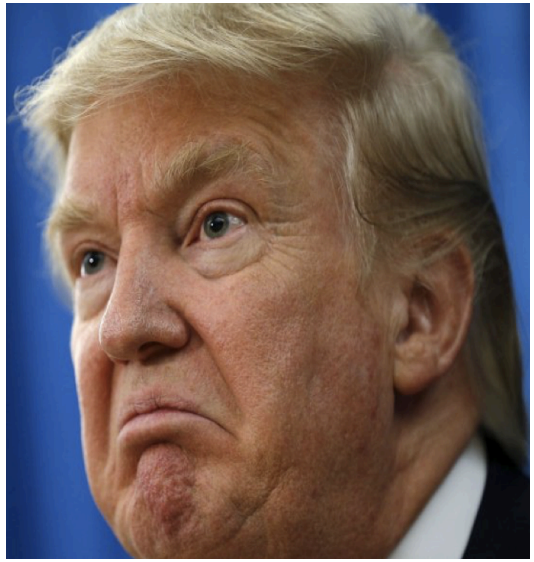
Populist Right

Populist Left

Inglehart, Norris 2016
Trump, Brexit, and the Rise of Populism
Economic & Cultural Backlash

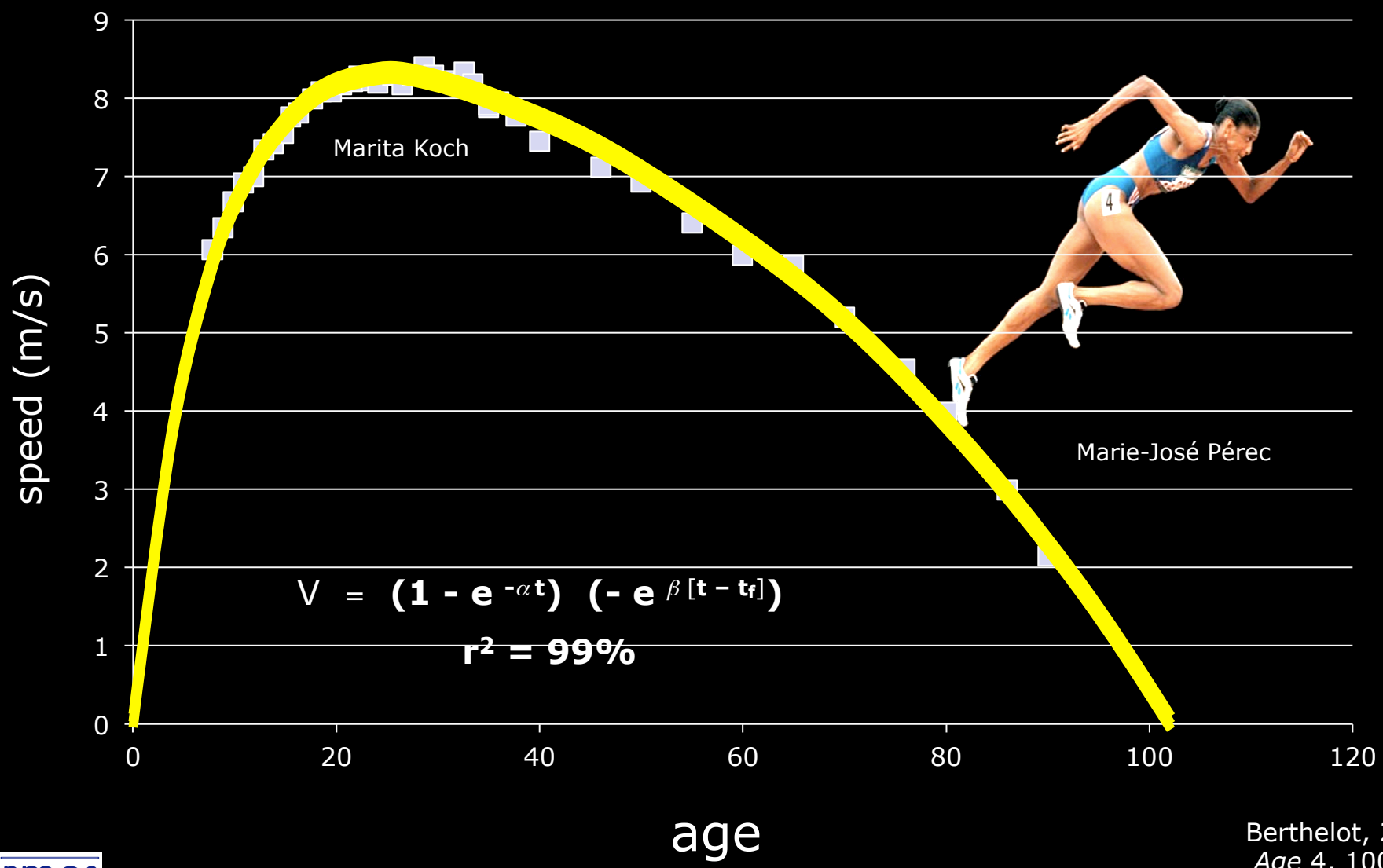
~~**main invisible**~~

contraintes émergentes
que le politique décide
trop souvent d'ignorer

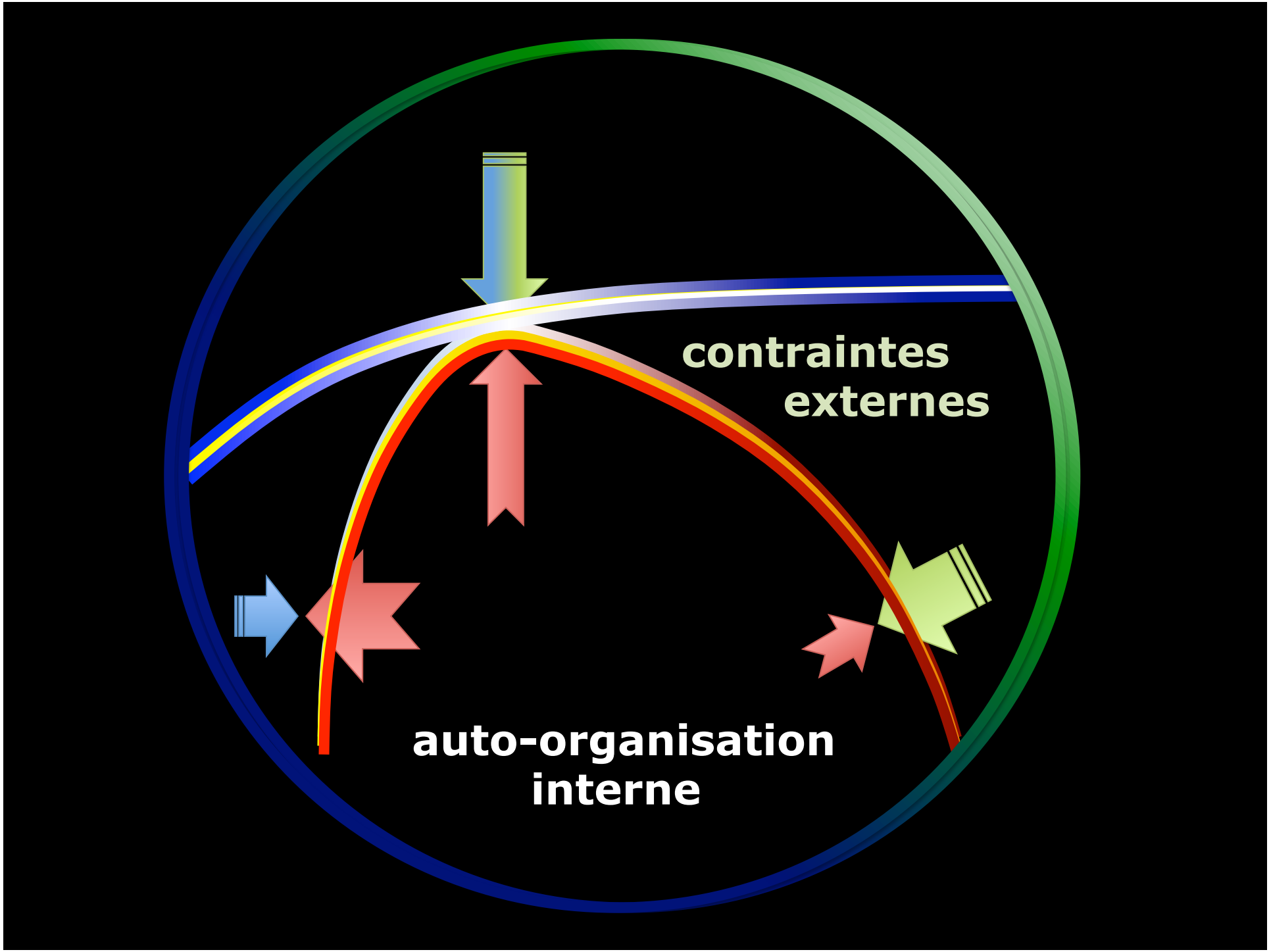


performance et âge

400m Féminin

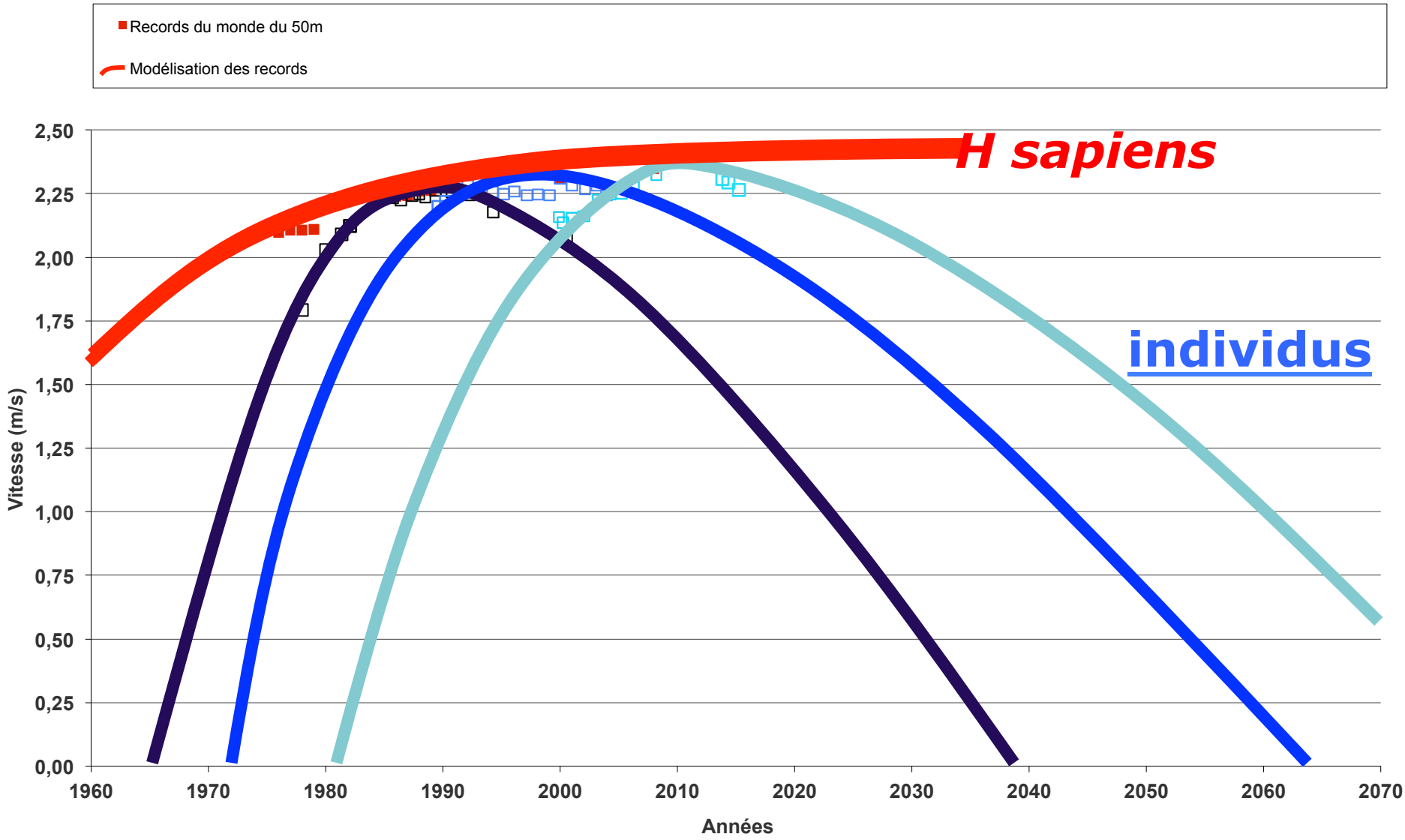


Berthelot, 2012
Age 4, 1001-9


contraintes
externes
auto-organisation
interne

records du monde 50m NL
contributions individuelles aux limites d'espèce

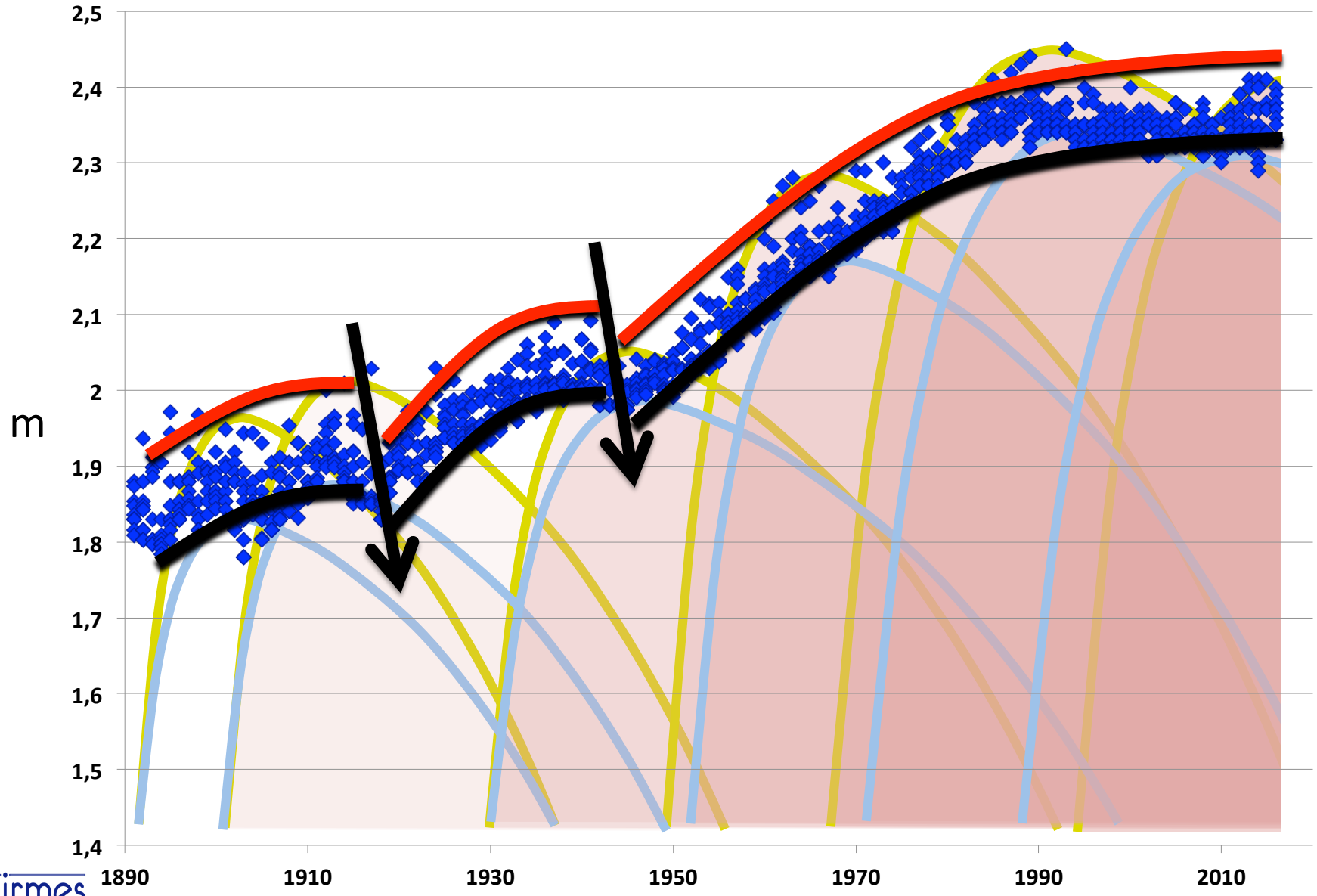
G Berthelot 2012
Age 4,1001



expansion et limites physiologiques

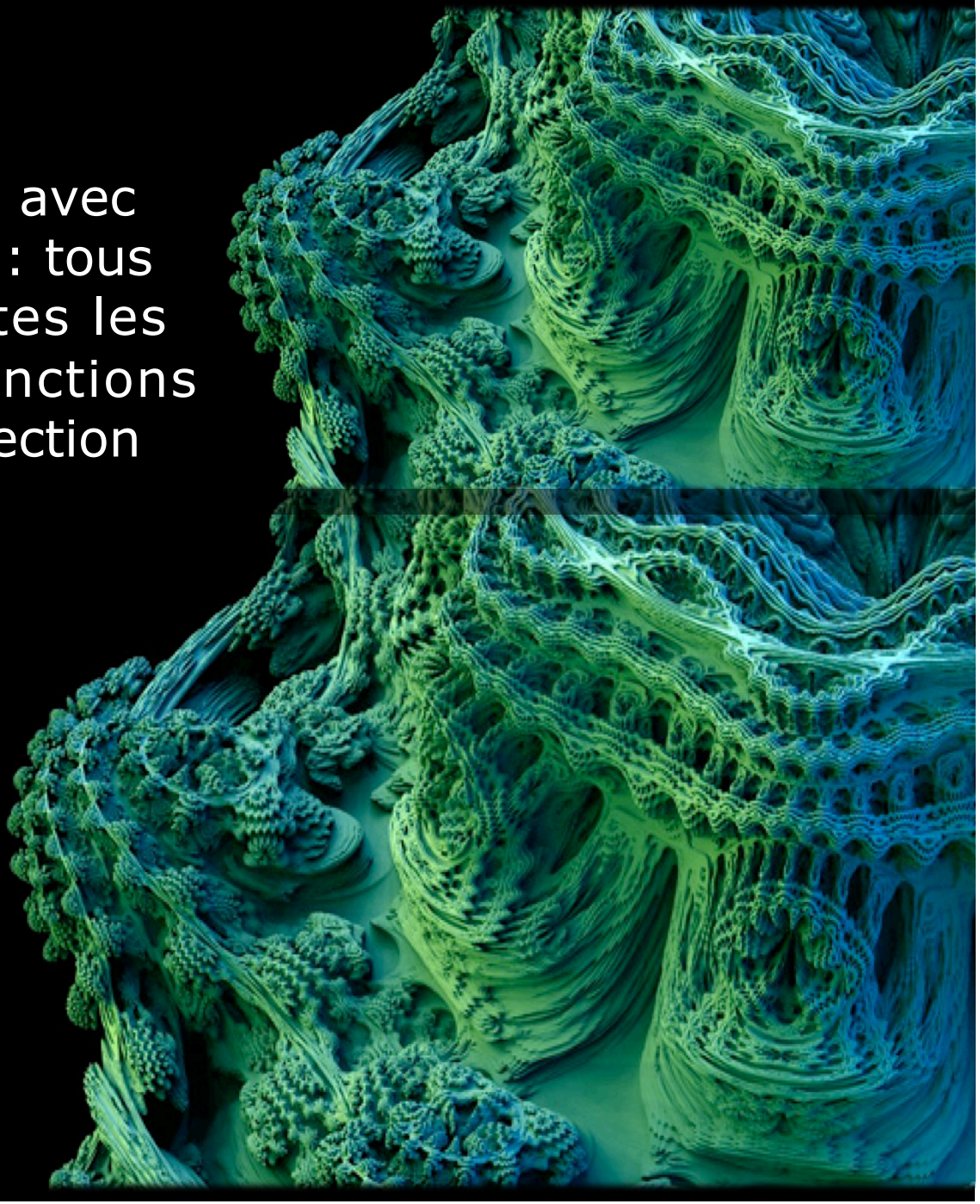
saut en hauteur

Top 10

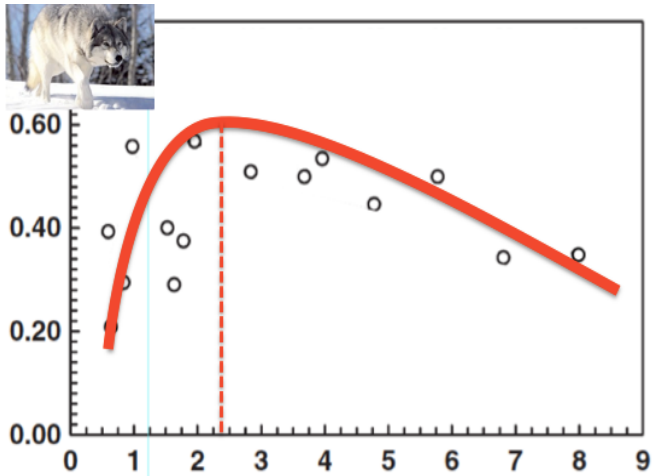


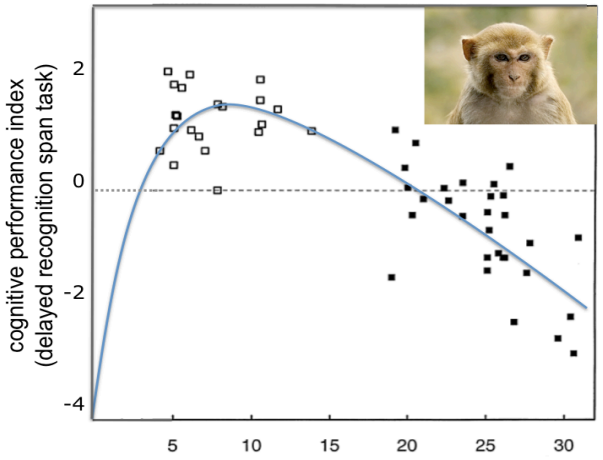
irmes

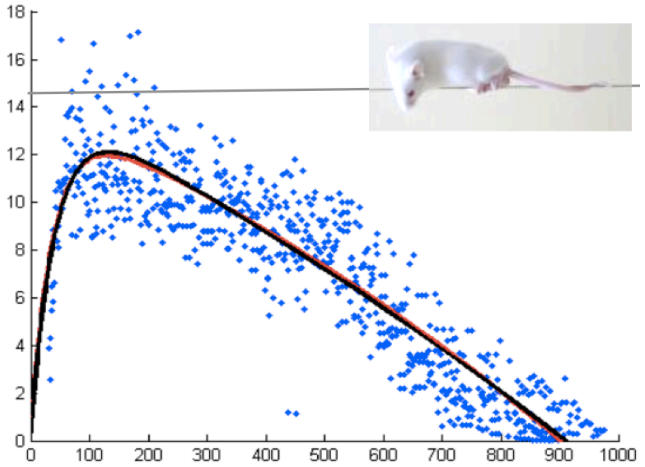
l’évolution travaille avec le système entier : tous les niveaux, toutes les régulations et fonctions sont soumis à sélection

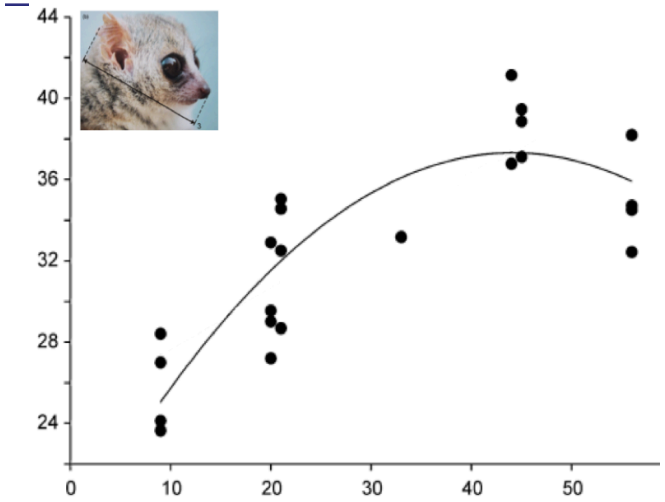


universalité de la physiologie animale

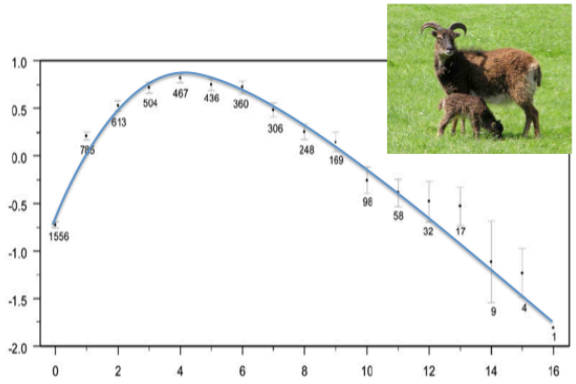


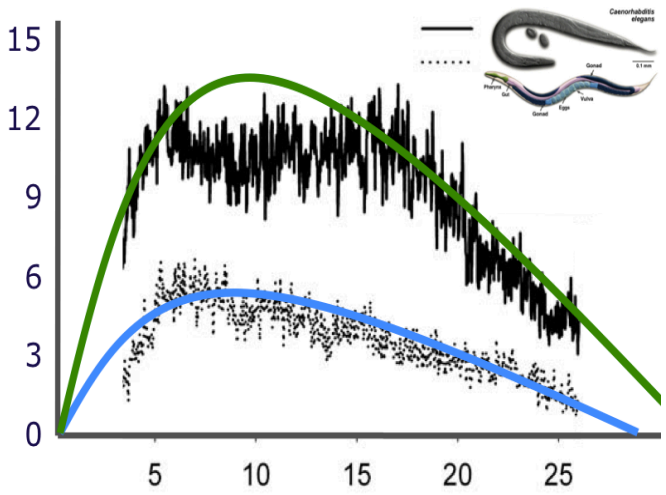


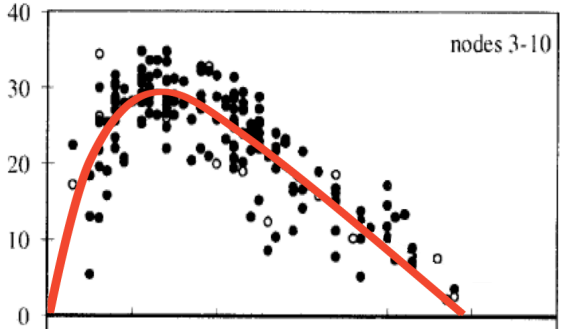




Age-Specific average
Fitness in Soay Sheep





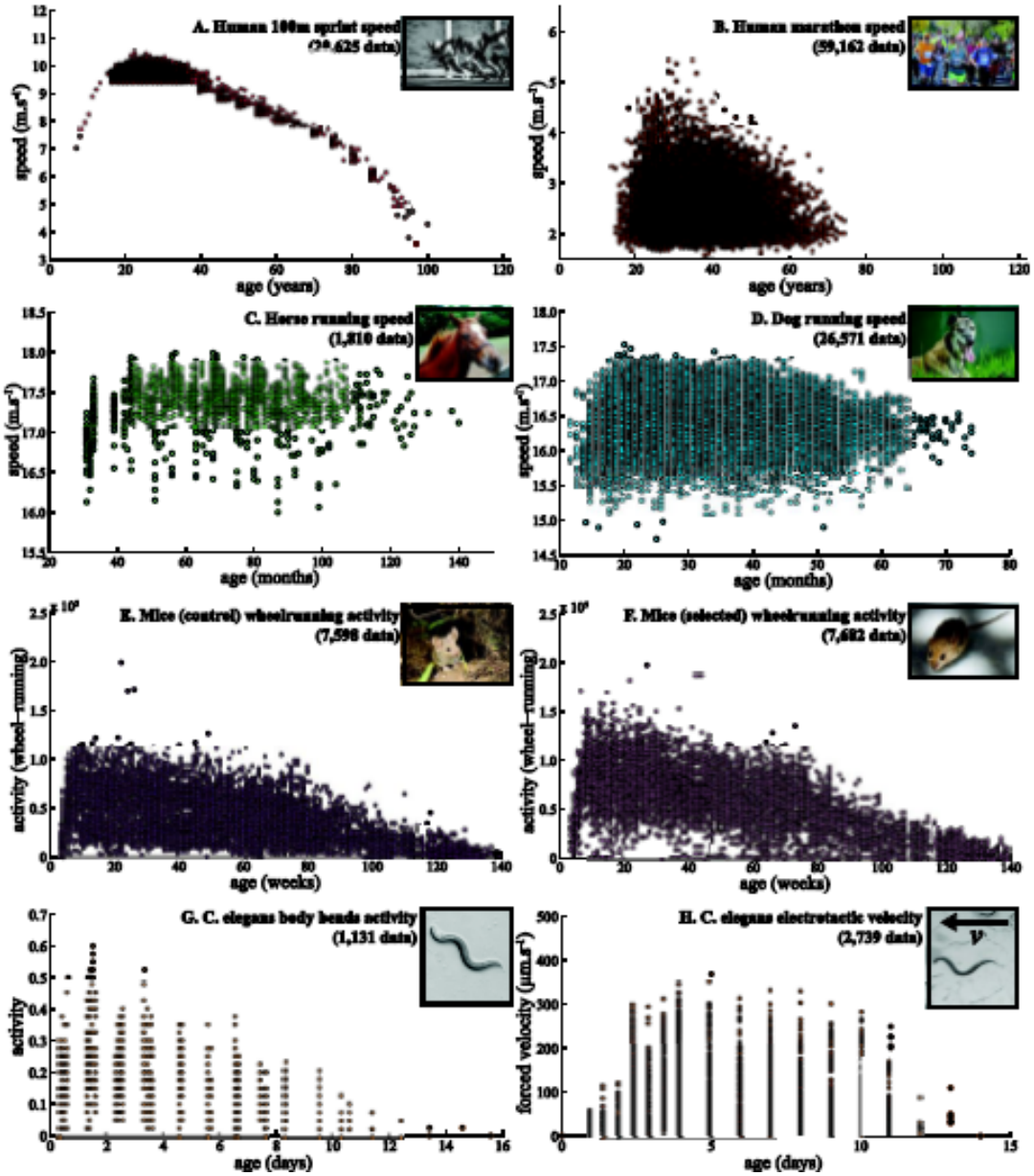


et végétale …

Adrien Marck
Thèse 9 nov 2016

irmes

différentes espèces



différentes échelles

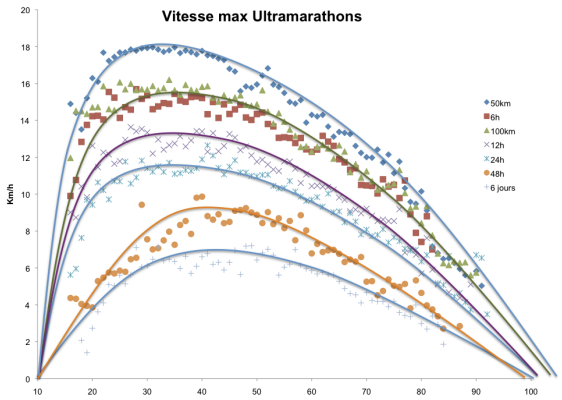
espèce

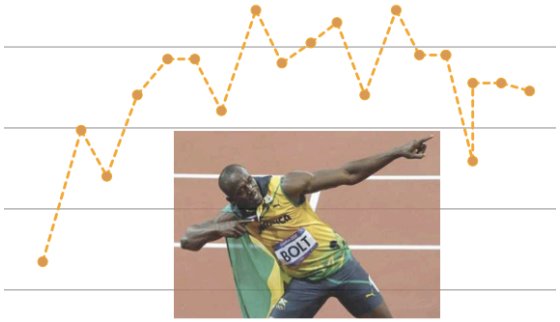
individu

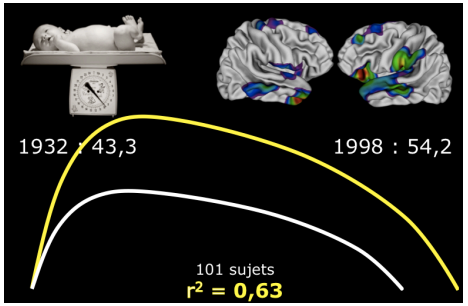
organisme

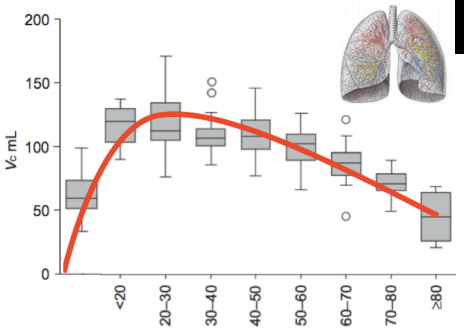
organe

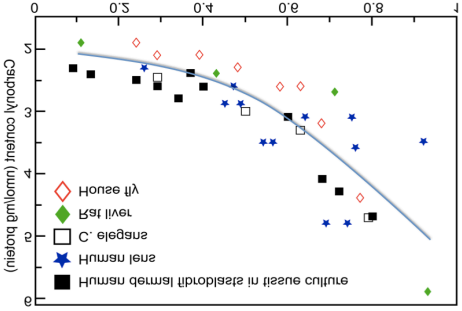
cellule



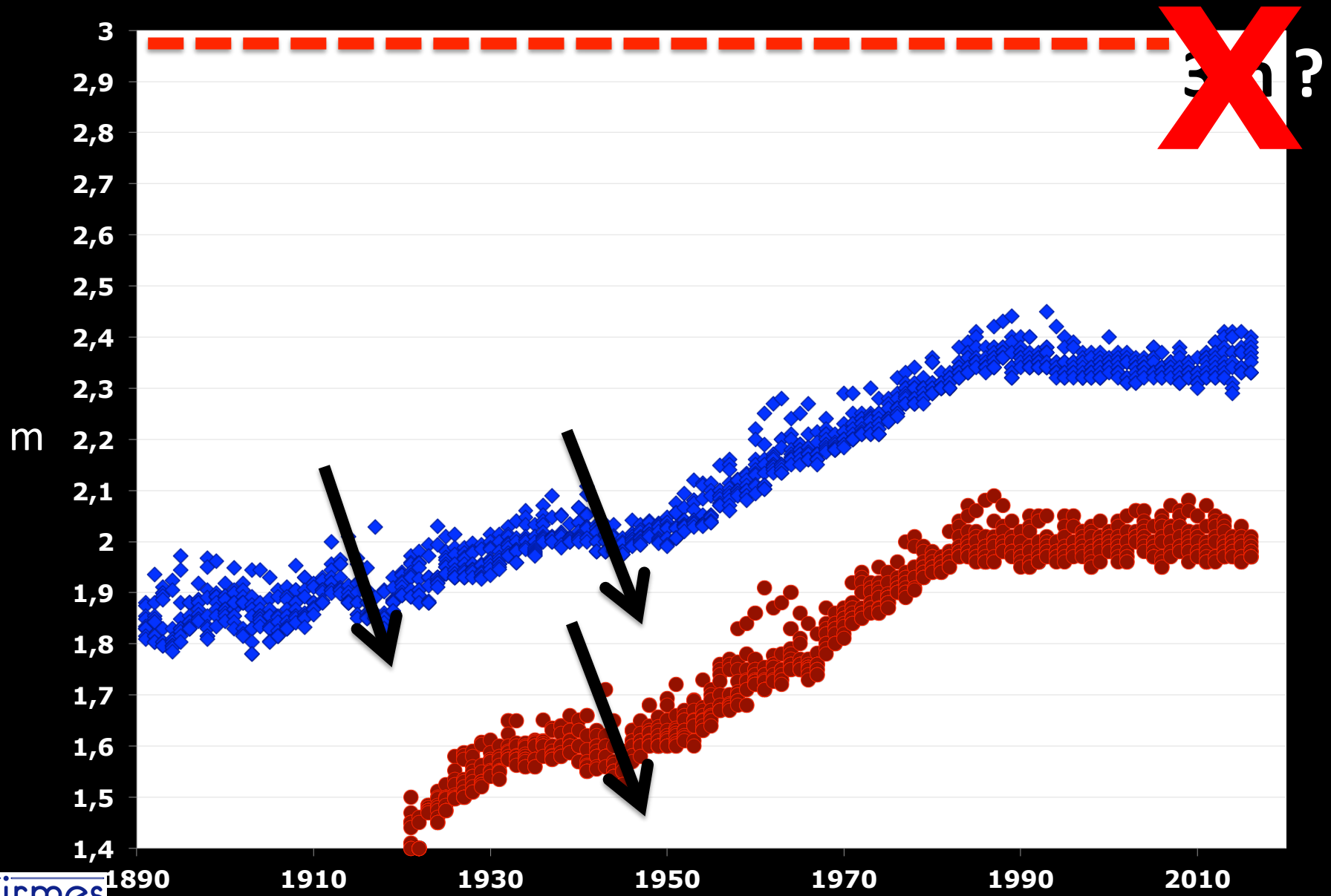








hauteur



irmes
institut de recherche biomédicale et d'épidémiologie du sport

Gu Yongqiang
Times 2013

Prypiat

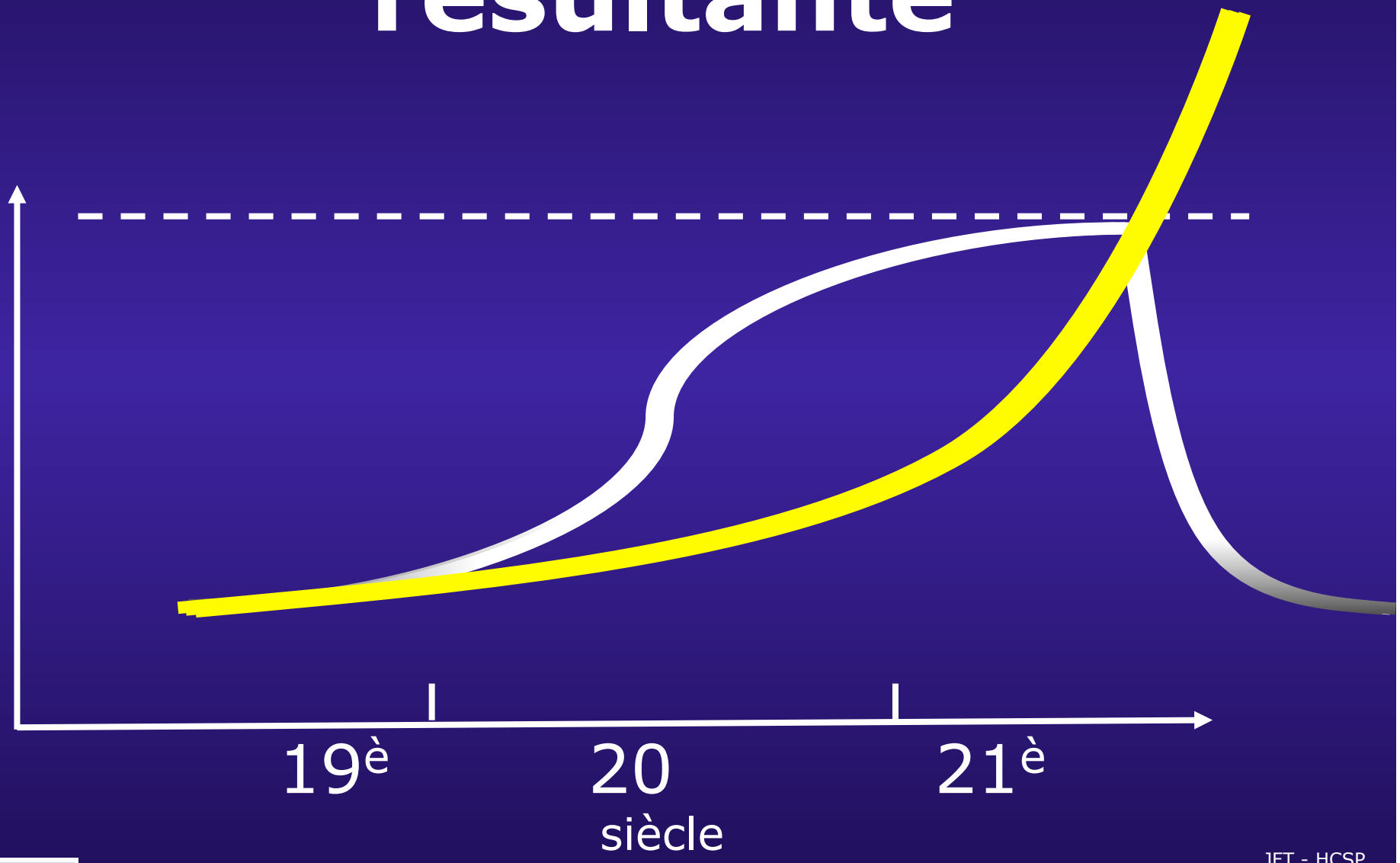
21ème siècle

Fukushima

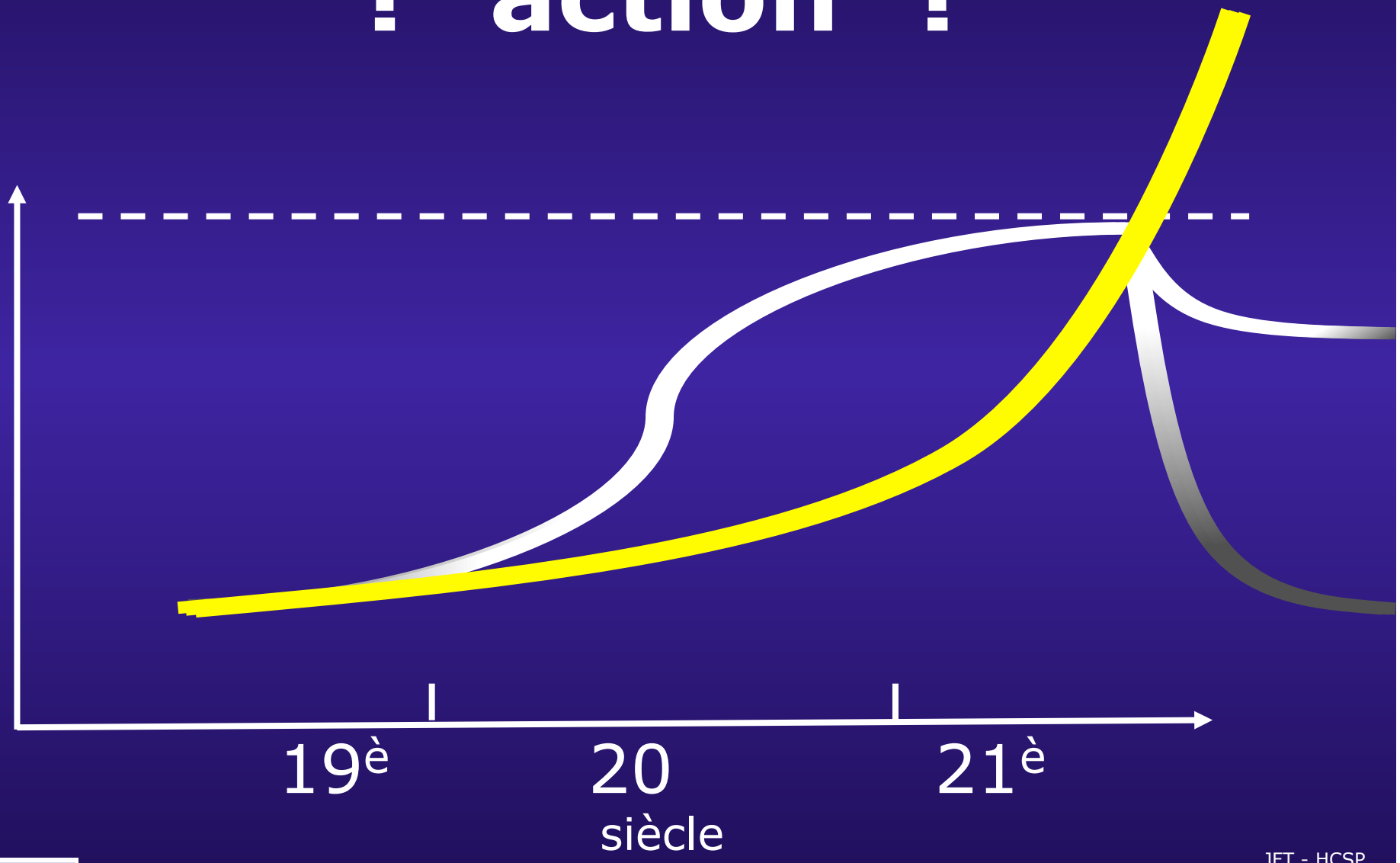
Daishi

21ème siècle

résultante



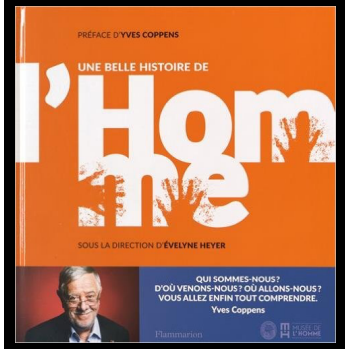
? action ?



porte sur l’avenir
?

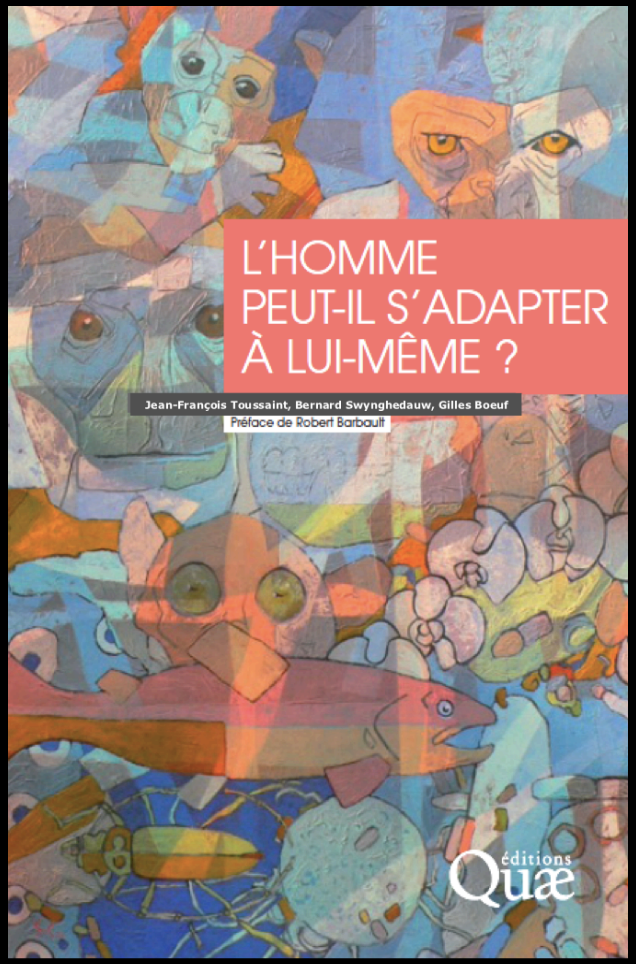
art

L'homme peut-il s'adapter à lui-même ?
quae 2012
Collège de France
11 février et 22-23 mai 2014

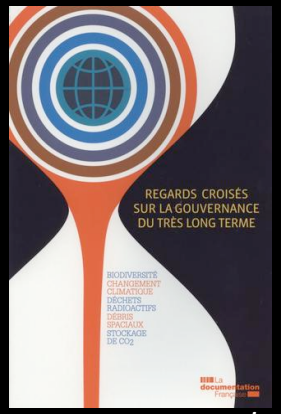


oct 2015

juin 2010

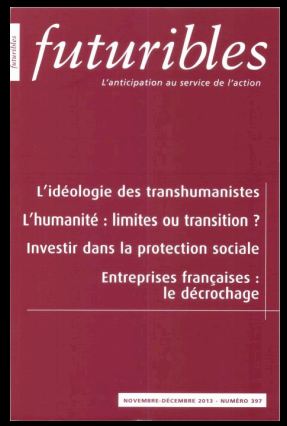


2012



gouvernance du long terme 2013

nov 2015



futuribles
nov 2013

JE SUIS CHARLIE