

Thermalism in Brazil

THE NEW FRONTIERS OF THE EUROPEAN HEALTHCARE SYSTEM
2013

The implementation of the EU Directive on the application of patients' rights in cross-border
traditional and thermal healthcare

Geol. Fabio Lazzerini

termalismo@terra.com.br

<http://termalismobrasil.blogspot.com.br>

[Face: Termalismo Brasil](#)

www.aguasdesaopedro.com

[Face: Aguas de São Pedro](#)



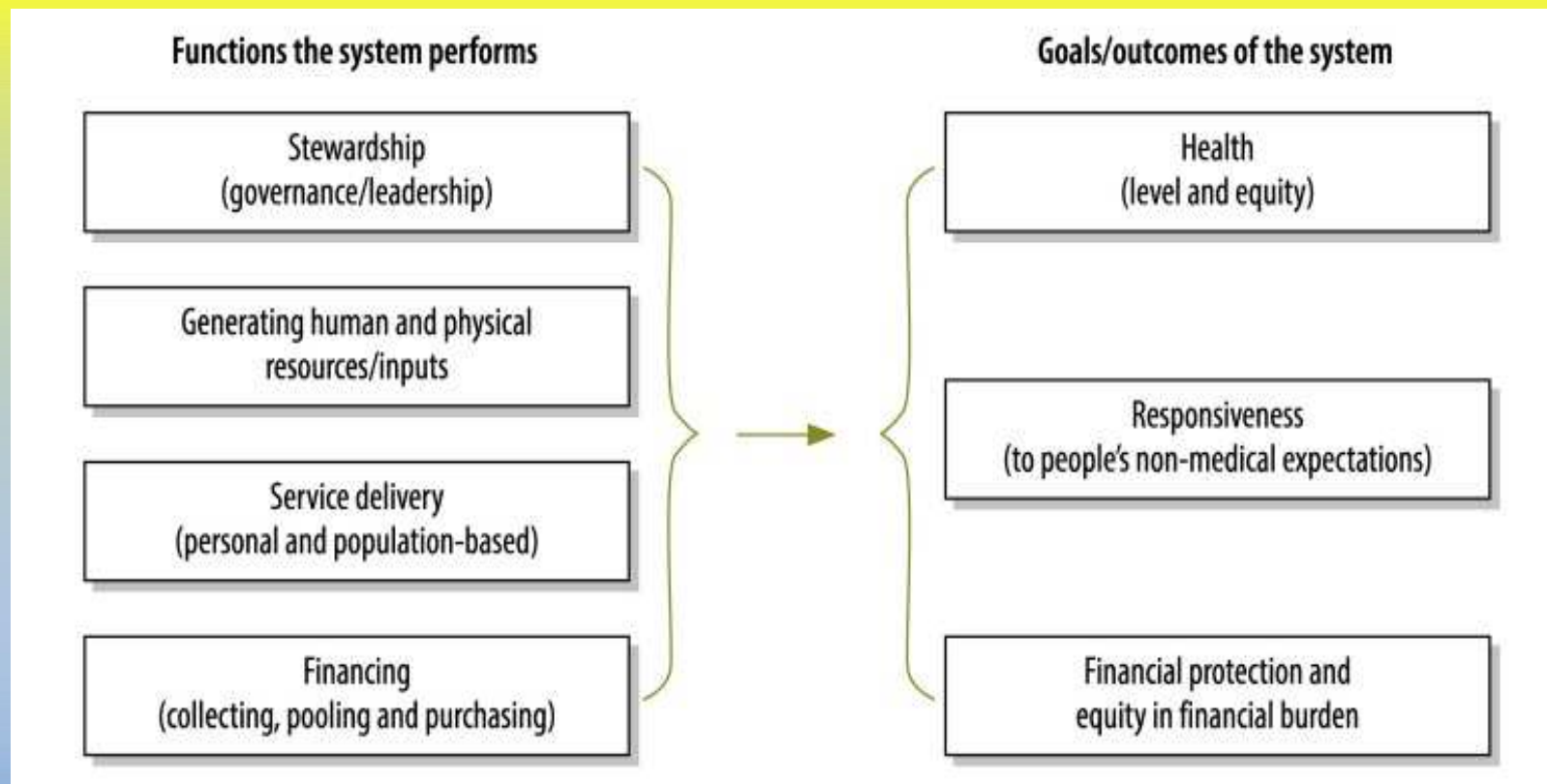
EU Global Health Research requires

- greater levels of (bio-medical and public health) research from and for developing countries,
- greater equity and pertinence to the priorities in developing countries;
- improved ownership of the national institutions and participation of civil society
- a more structured and effective link with evidence-based decision making; closely linked with the EU challenge of enhanced health sector policy dialogue.
- the global research funding architecture needs to be harmonised and aligned.
- the EU will recall the international attention to the global public good for health and call for global investments in the advance of humanity in health, beyond and in addition to development and research efforts.

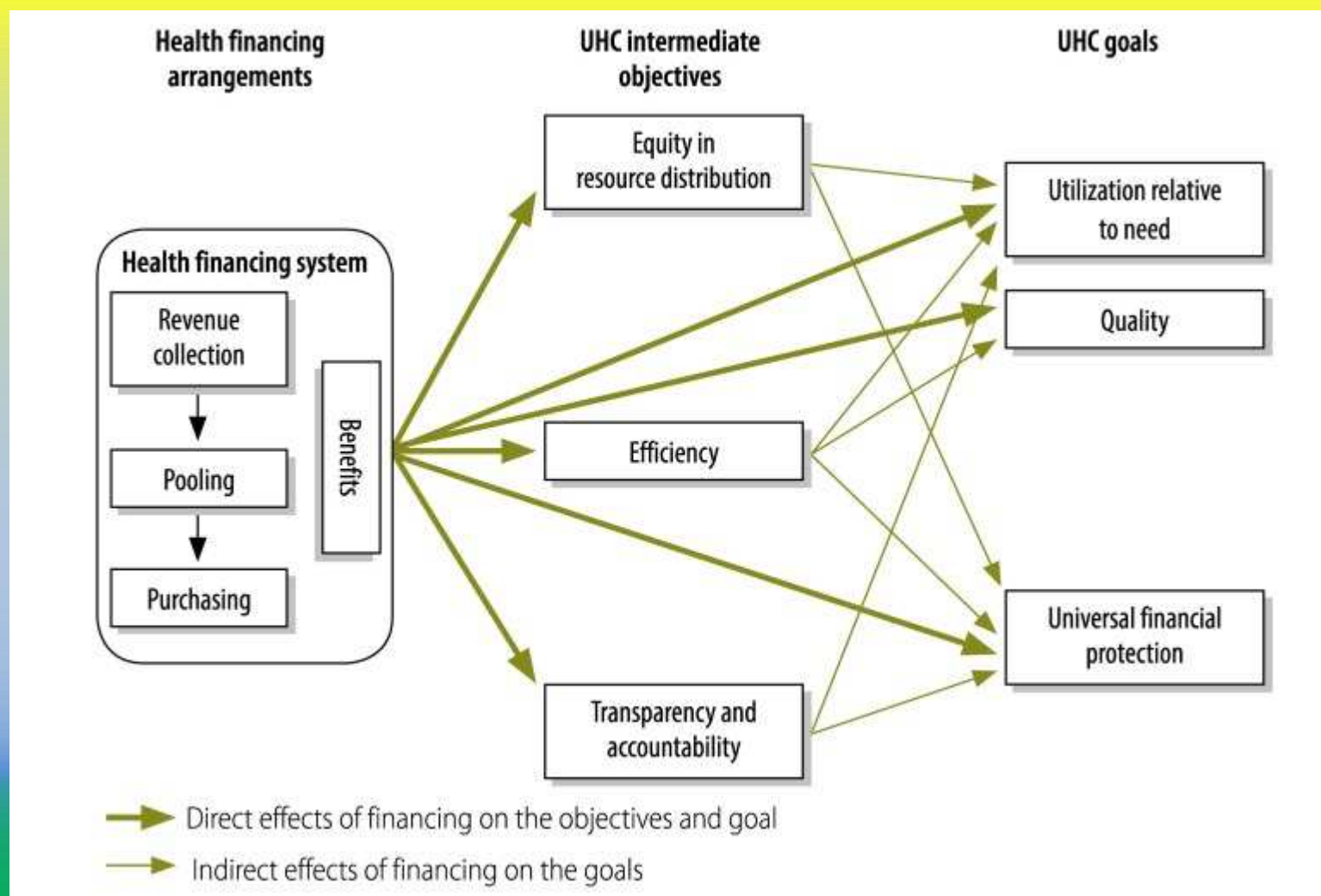
<http://ec.europa.eu/health> October – December 2009

Health system functions and goals

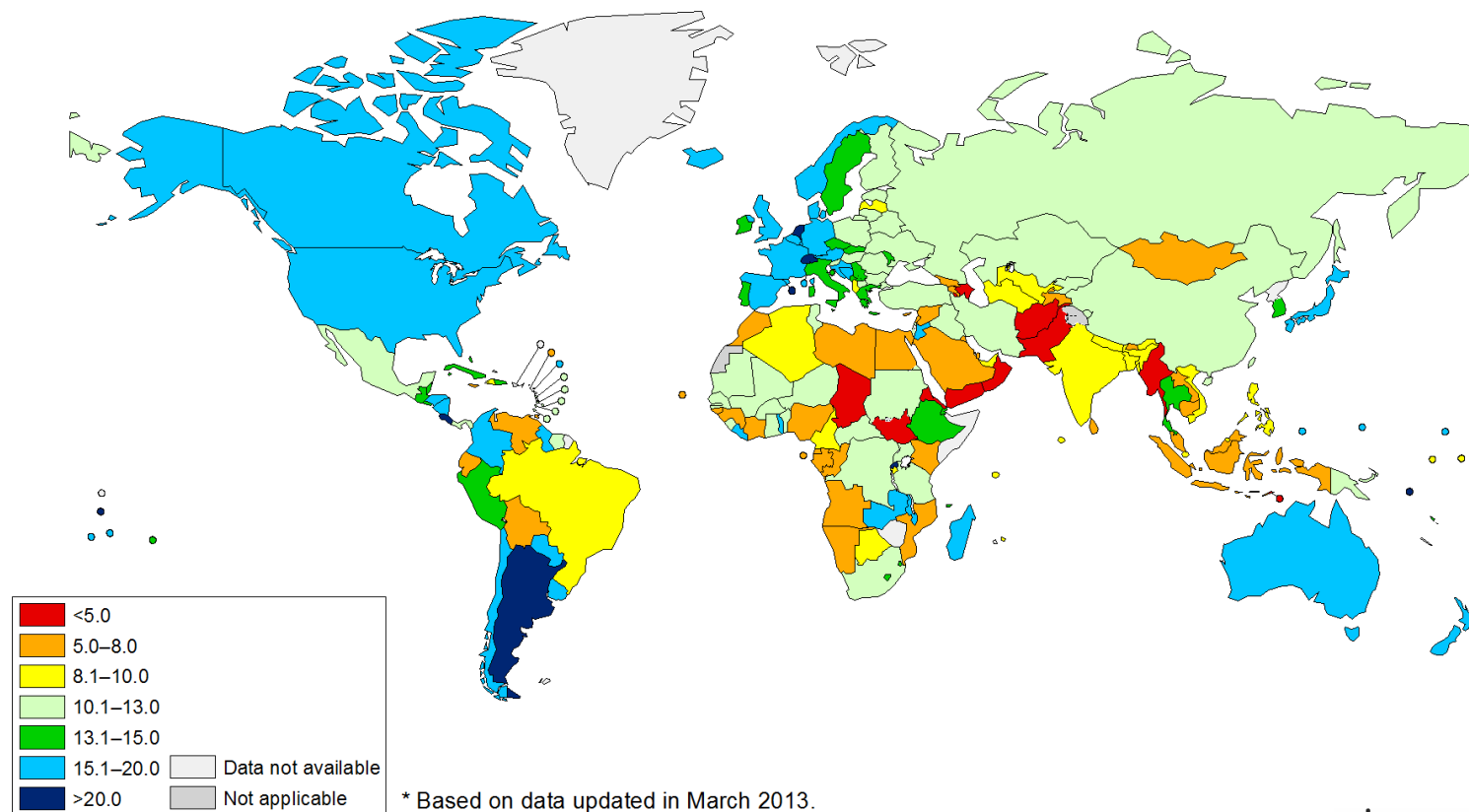
(Adapted from Duran et al., 2011)



Intermediate objectives and final goals of universal health coverage (UHC) that health financing can influence



General government expenditure on health as a percentage of total government expenditure (in US\$), 2011 *



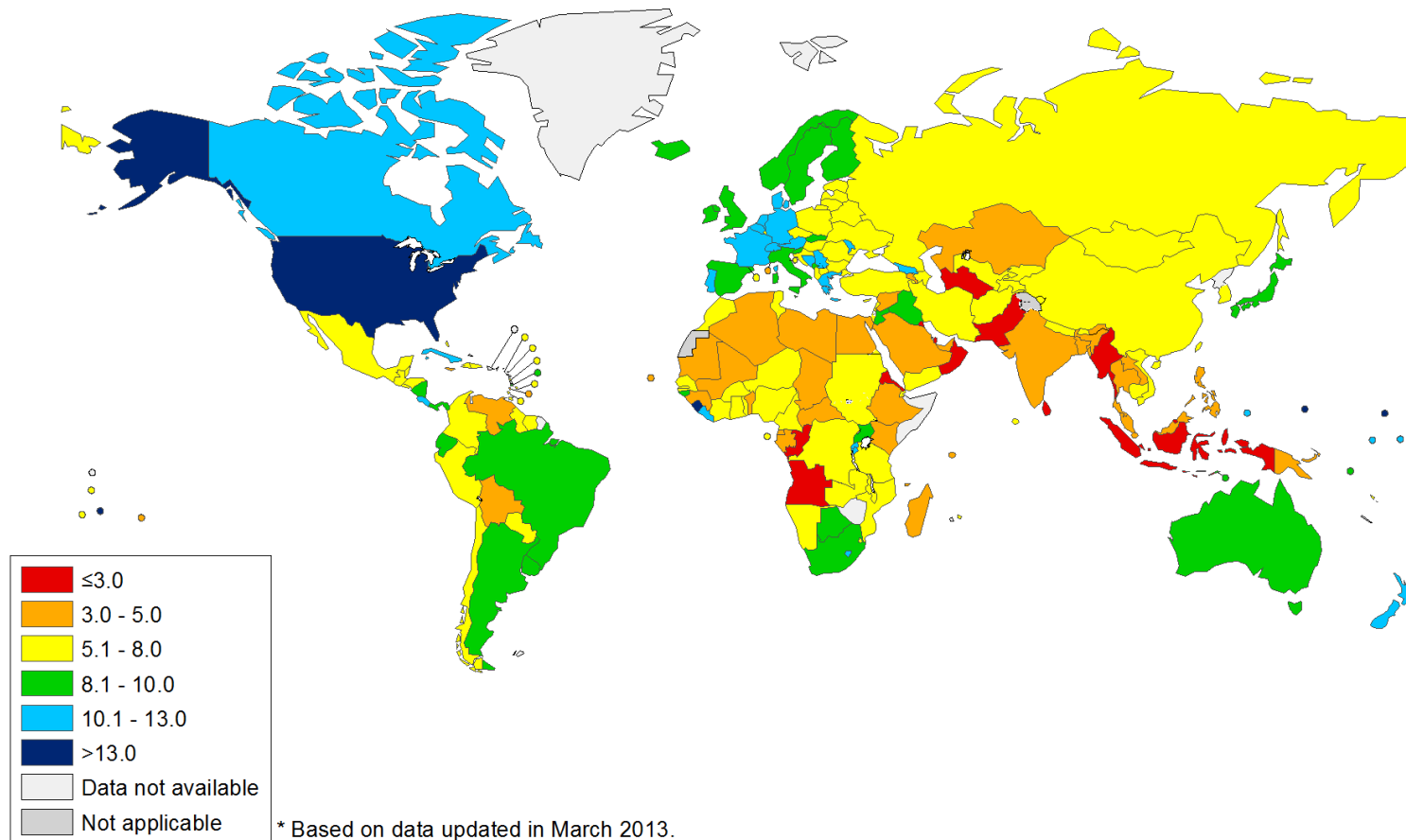
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: Global Health Observatory, WHO
 Map Production: Public Health Information and Geographic Information Systems (GIS)
 World Health Organization



© WHO 2013. All rights reserved.

Total expenditure on health as a percentage of the gross domestic product, 2011 *



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: Global Health Observatory, WHO
 Map Production: Public Health Information
 and Geographic Information Systems (GIS)
 World Health Organization



© WHO 2012. All rights reserved.

OOP expenditure as a proportion of total health expenditure in the countries in the European Region, 2009 European Health for All database. *Note: a WHO European Region*



Selected cost-of-illness studies in which cost is expressed as percentage of national health expenditure Suhrcke et al. (2005)

<i>Condition/risk factor</i>	<i>Country</i>	<i>Percentage of national health expenditure</i>	<i>Year</i>
Coronary heart disease	United Kingdom	11	1999
Schizophrenia	France	2	1992
	United Kingdom	1.7	1992–03
	Netherlands	1.6	1989
Depression	United Kingdom	0.9	1990–01
Mental illness	United States	7	1990
Obesity	France	2	1992
	Portugal	3.5	1996
Diabetes	Various	2.5–15	Various
Tobacco	Germany	5.6	1993

Stephens & Satterthwaite, 2008)

- **The population of each urban center and its rate of change are also influenced not only by such international and national factors but also by local factors related to each very particular local context**
- **including the site, location, natural resource endowment, demographic structure, existing economy, and infrastructure**
- **(the legacy of past decisions and investments) and the quality and capacity of public institutions.**

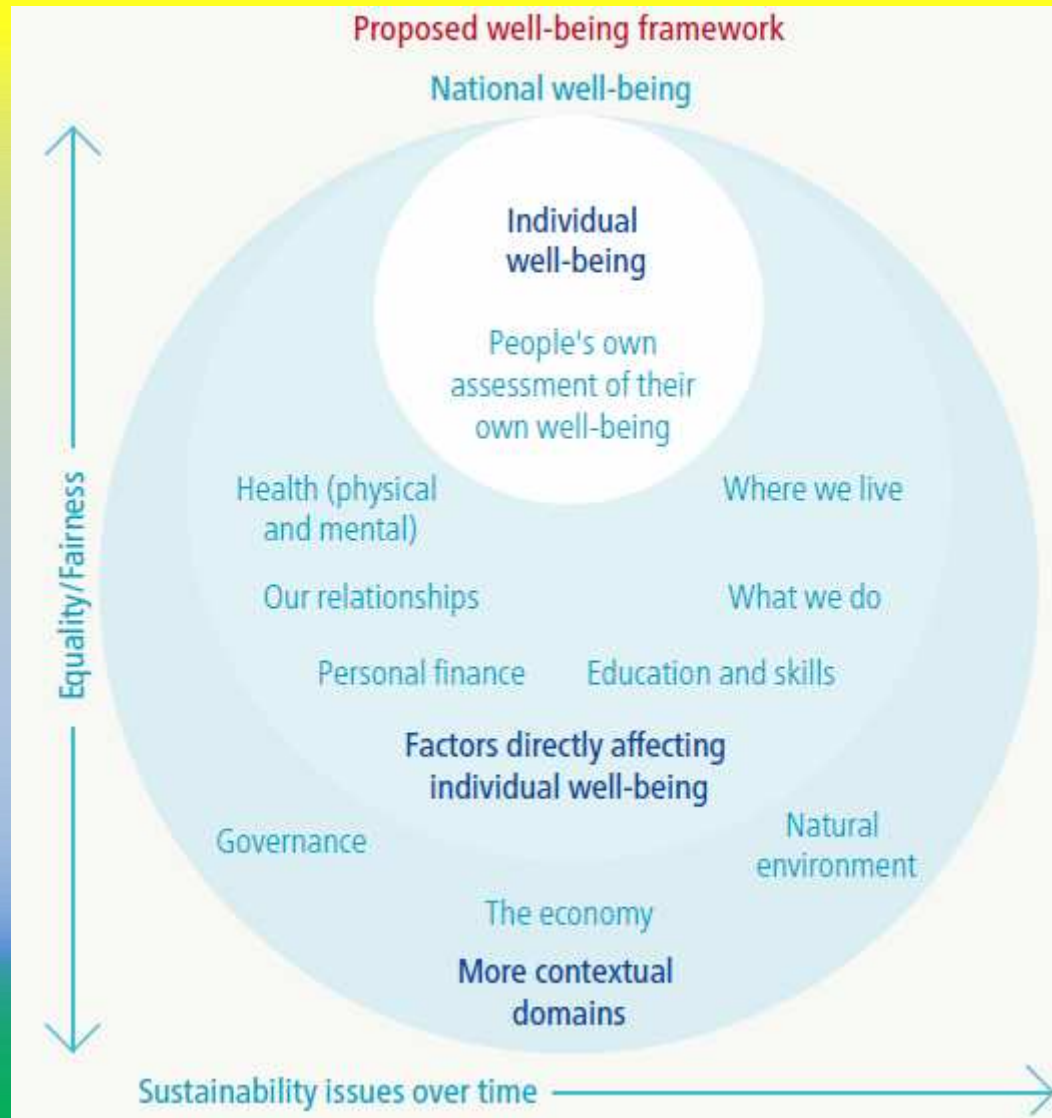
European Centre for Environment & Human Health

- **Health and Wellbeing from the Environment**
- The health and well-being impacts (both positive and negative) taking part in environmental enhancement/conservation activities for different groups of people.
- Academic theories include BIOPHILIA which suggest an evolutionary connection between humans and the natural world which causes individuals to seek out contact with nature and for them to experience negative health impacts when unable to do so (Wilson 1984).
- Climate change and weather is part and parcel of the environmental context and the drivers of behavioural change.
- Examining the barriers and motivators that influence public usage of the marine environment for recreation, particularly from a health and well-being perspective and whether those motivating factors have the potential to be used to encourage more people to use the sea and coast for the health and well-being benefits.
- Healing or restorative places environment.

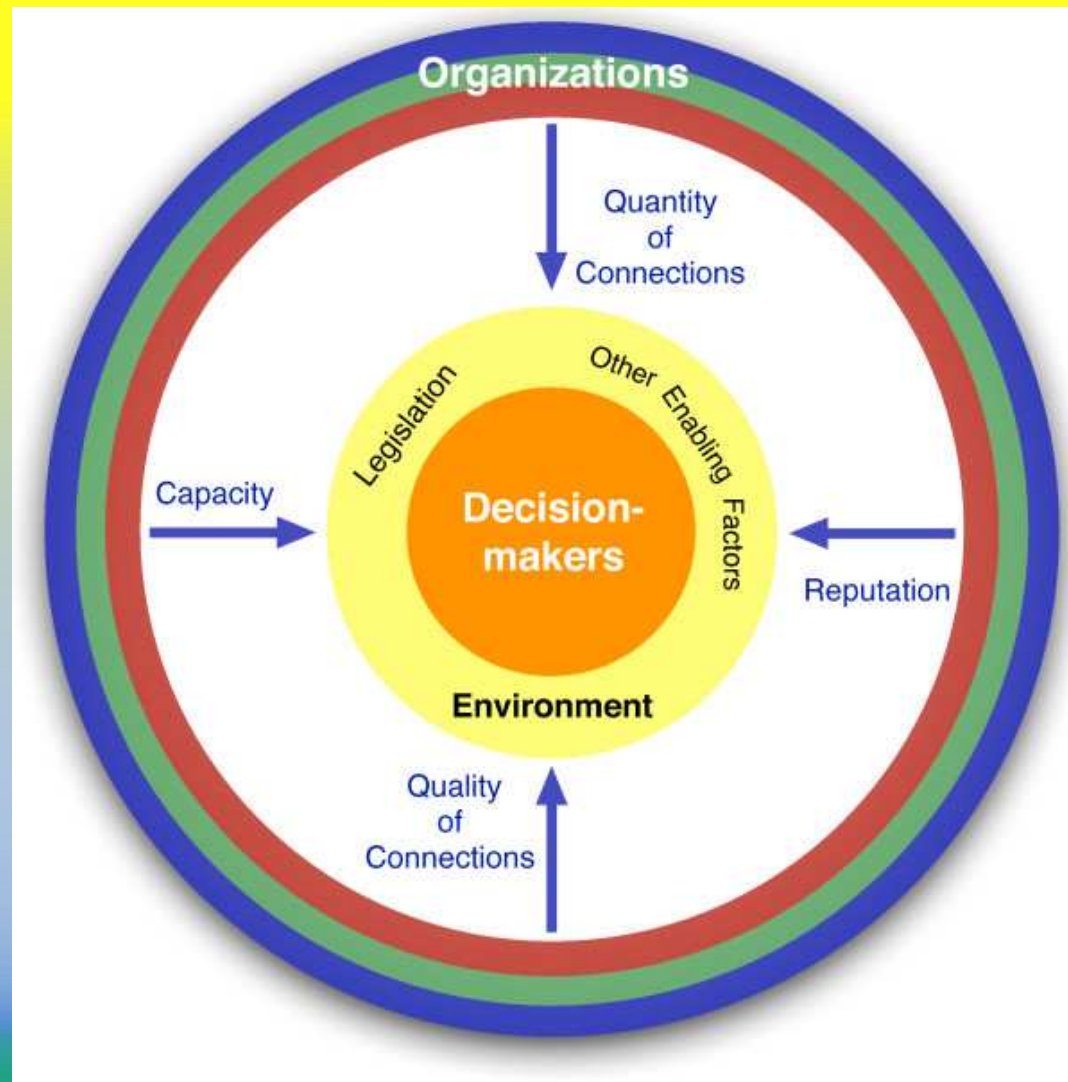
Interconnections: Environment & Human Health



United Kingdom Office for National Statistics (ONS, 2010)



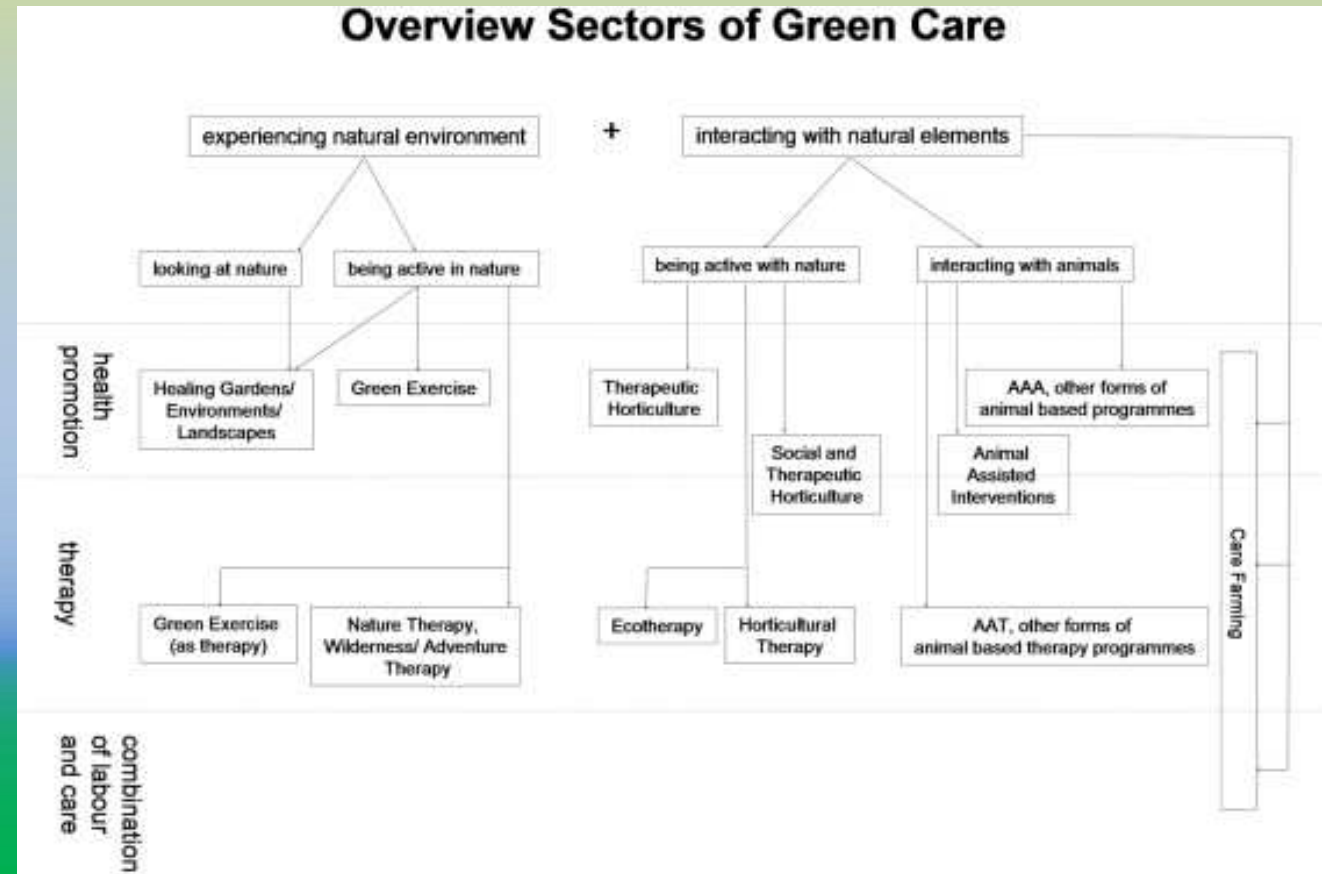
The four dimensions of embeddedness (Koon et al., 2013)



Green Care and Traditional Health Care



Overview Sectors of Green Care

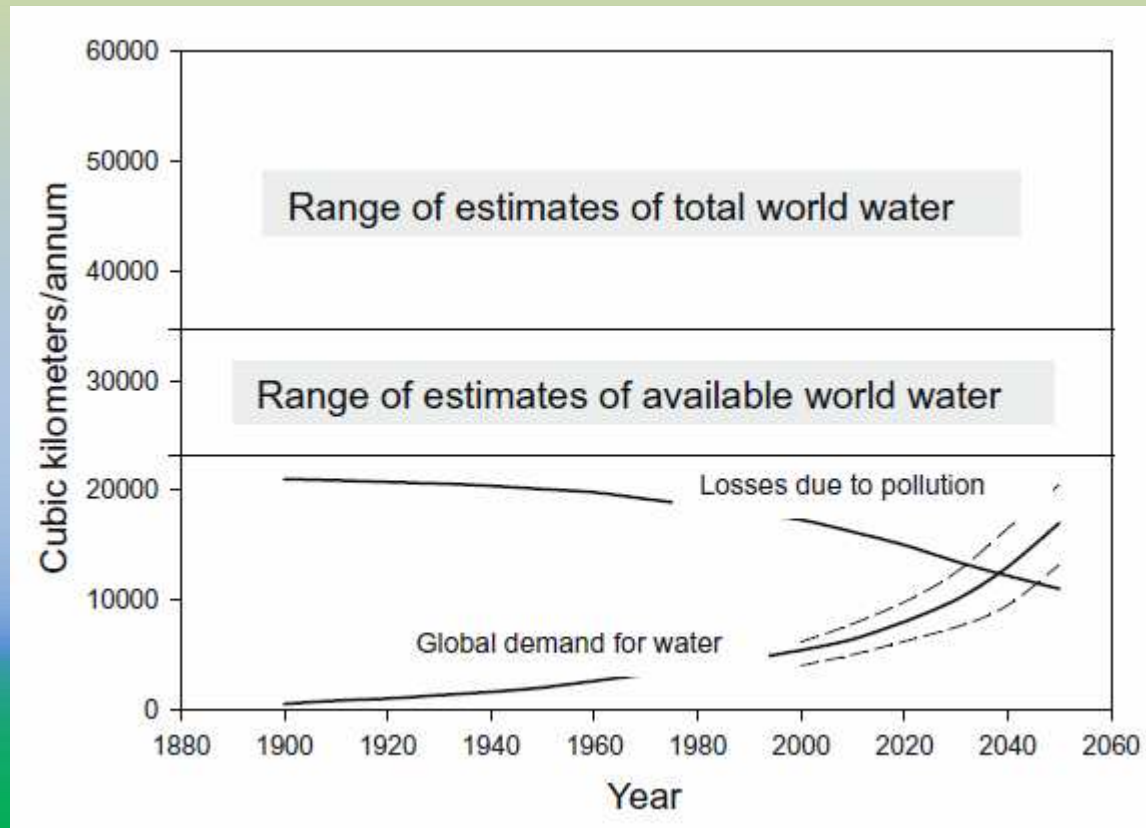


Environmental health services and Medical Geology

= just negative evidences research

– Millenium indicators database (UN Project)

- **integrated urban water management (IUWM)**
- Scenarios for world water resources and demands (Edmunds, 2009)



EU Water Legislation

The European Council Directive 80/777/EEC of 15 July 1980 on the approximation of the laws of the Member States relating to the exploitation and marketing of natural mineral waters (Official Journal L 47 of 20.02.1981) was amended by the European Parliament and Council Directive 96/70/EC of 28 October 1996.

The Directives concern the water extracted from the ground of a Member State and recognised as the natural mineral water by the responsible authority. They also concern the water extracted from the ground of the **Third-World countries. The Directive 96/70/EC also sets the validity of the certification of water extracted from the ground of a Third-World country at 5 years.**

CAIM

- That CAM use is expanding and is now being addressed in a much more formal way than before necessitates greater attention by conventional (allopathic) health care practitioners, decision-makers and researchers.
- **Chronically ill people are reported to use CAM two to five times more often than non-chronically ill people.**
- Demand for CAM services is expected to rise particularly as a result of population aging and a subsequent likely increase among people who will experience one or more chronic health problems.

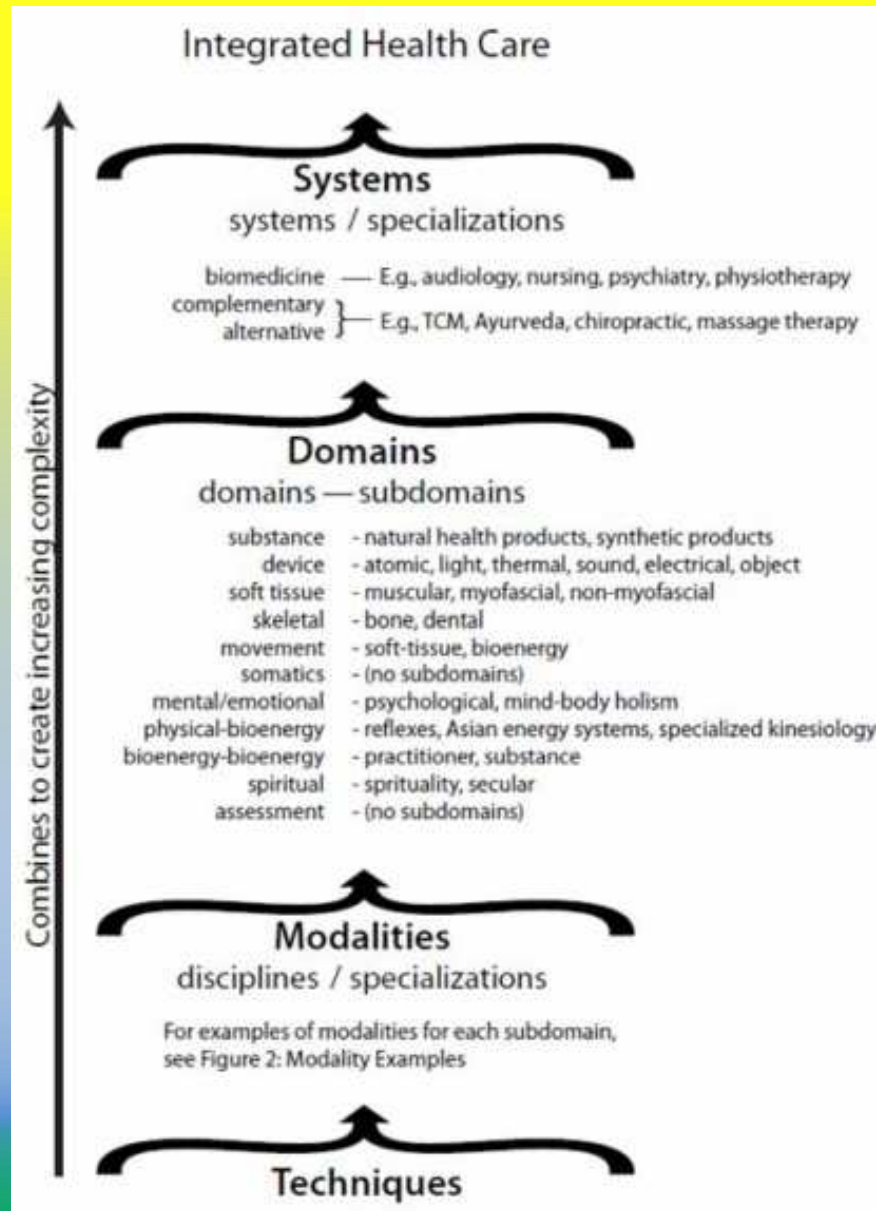
General recommendations for EU based on the global analysis of the CAM R&D situation

- A broad range of mixed methods research strategies should be used to investigate CAM within the EU. The choice of method(s) for any particular project or experiment should be based on the specific scientific question and should focus on delivering safe and effective health interventions to EU citizens.*
- The CAM research strategy for Europe should be based on the popularity of a specific intervention and related to the national or regional public health needs and disease burden.*
- We suggest the formation of a centralised EU CAM centre with the responsibility to operationalise the CAMbrella recommendations in collaboration with selected EU member states and appropriate (worldwide) academic institutions to enable evidence based health sector reform with appropriate CAM interventions in the EU.*

Search results when applying broad CAM terms (Franzel *et al.*, 2013)

	(Qualitative research)	CAM	(Complementary and alternative medicine)	(Qualitative research) AND CAM	(Qualitative research) AND (Complementary and Alternative Medicine)	Number of included publications in meta-ethnography (precision)
PubMed	61.067	25.339	4.194	259	157	26
MedPilot	233.402	178.706	15.423	960	1.441	1
Cochrane library	662	86	321	14	1	0
CAMbase	349	183	280	1	0	0
CAM-QUEST®	1	15.856	43	1	0	0
API-on©	16	6	0	0	0	0
CINHAL	7.061	2.684	8.438	31	46	1
GreenPilot	265.822	255.664	8.230	34.147	1.422	0
Heclinet	7	0	0	0	0	0
Psydoc	10	33	0	0	0	0
PsynINFO	133	3	20	0	5	1
Sinbad	2	1	1	0	0	0
Somed	65	24	16	0	0	0
DIMDI incl. AMED	55.479	87.008	14.725	191	187	1

Taxonomy overview (Porcino & MacDougall, 2009)



CAM: Modality examples (Porcino & MacDougall, 2009)

DOMAIN	SUBDOMAINS	MODALITY examples
Assessment	(none)	- diagnostic imaging, iridology, medical intuition
Spiritual	- spirituality - secular	- prayer, Johrei, lomi ka'ala hoku, shamanism - soulwork, trancework, inner journeying, meditation
Bioenergy modulation	- practitioner - substance	- energy work, Healing Touch, Jin Shin Jyutsu, Reiki - homeopathy, flower essence
Physical-Bioenergy manipulation	- reflexes - Asian/Oriental energy systems - specialized kinesiology	- reflexology - shiatsu, nuad bo ram - BodyTalk, Touch for Health
Mental/Emotion	- psychological - mind-body holism	- Adlerian, Jungian, art therapy, groups, dream work - doula, Emotional Freedom Technique, hypnotherapy
Somatics Education	(none)	- Alexander, Rosen method, Trager, Feldenkrais
Fitness/Movement	- soft-tissue - bioenergy	- pilates, aerobics, weight training - tai chi, yoga, chi gong
Skeletal manipulation	- bone - dental	- chiropractic adjustments, craniosacral therapy
Soft-tissue manipulation	- muscular - myofascial - non-myofascial tissues	- lomilomi, Swedish, Esalen - Bowen, Hurley-Osborn, structural integration - manual lymph drainage, surgery
Device	- atomic - light - thermal - sound - electrical - object	- radiation treatments - colour puncture, colour therapy, laser treatments - stone therapy, hydrotherapy - sound therapy, music therapy - bioneurofeedback, TENS, electroacupuncture - colonic hydrotherapy, acupuncture, cupping
Substance	- natural health products - synthetic products	- diets, herbology, vitamins, minerals, essential oils - pharmaceuticals, chelation therapy

Lista of CAM therapies The Cochrane Library (Wieland et al., 2011)

Acupressure
Acupuncture (e.g., needle acupuncture, electroacupuncture)
Alexander technique
Aromatherapy
Arts therapy (e.g., dance therapy, drama therapy, music therapy)
Ayurvedic traditional medicine (Ayurveda)
Balneotherapy
Bee products (eg, honey, pollen, propolis, royal jelly, venom)
Biofeedback
Chelation therapy[†]
Chinese traditional medicine
Chiropractic (i.e., spinal manipulation)
Color therapy (i.e., chromotherapy)
Craniosacral manipulation
Dietary supplements (non-herbal)[†] (e.g., vitamins, hormones, amino acids)
Diet therapy[†] (e.g. low fat diets, vegan diets)
Distant healing
Electric stimulation therapy[†] (eg, transcutaneous electrical nerve stimulation)
Electromagnetic therapy[†]
Eye Movement Desensitization and Reprocessing (EMDR)
Feldenkrais method
Herbal supplements (eg, echinacea, garlic)
Homeopathy
Hydrotherapy
Hyperbaric oxygenation[†]
Hypnosis
Imagery (i.e., visualization techniques)
Light therapy[†] (phototherapy)
Magnetic field therapy[†] (eg, transcranial magnetic stimulation)
Massage
Meditation
Morita therapy
Moxibustion
Naturopathy
Osteopathic manipulation
Ozone therapy[†]
Play therapy
Prolotherapy
Qi gong
Reflexology
Reiki therapy
Relaxation techniques
Snoezelen
Speleotherapy
Spiritual healing (eg, prayer)
Tai chi
Therapeutic touch
Traditional healers and healing practices (other than Chinese) (eg, Kampo, Shamanism)
Tui na
Ultrasonic therapy[†]
Yoga

Totals CAM include reviews in progress (protocols) The Cochrane Library (Wieland et al., 2011)

Alternative Medical Systems (107)

- ▶ Ayurvedic Medicine (4)
- Chinese Traditional Medicine (87)
- ▶ Chinese herbal drugs (87)
- ▶ Homeopathy (12)
- ▶ Japanese traditional medicine (1)
- ▶ Naturopathy (1)
- ▶ Tibetan traditional medicine (2)

Natural Product Based Therapies (354)

- ▶ Chelation therapy (1)
- ▶ Hydrotherapy (3)
- Nutrition therapy (280)
- Diet therapy (22)
- ▶ Calorie control or calorie restriction (2)
- ▶ Carbohydrate-restricted diet (1)
- ▶ Casein-free diets (1)
- ▶ Fat-restricted diet (2)
- ▶ Gluten-free diet (1)
- ▶ High-fiber diet (2)
- ▶ Low glycemic-index diet (4)
- ▶ Protein-restricted diet (3)
- ▶ Sodium-restricted diet (3)
- ▶ Vegetarian or vegan diet (1)

▶ Other plants or plant extracts (29)

- ▶ Prolotherapy (1)
- ▶ Speleotherapy (1)
- ▶ Topical therapies (5)
- Unconventional synthetic drugs (1)
- ▶ Laetrile
- ▶ Procaine (1)

Energy Therapies (154)

- Acupuncture therapy (87)
- ▶ Acupressure (5)
- ▶ Acupuncture (69)
- ▶ Electroacupuncture (6)
- ▶ Laser acupuncture (6)
- ▶ Moxibustion (1)

Breathing exercises (0)

- Qi gong (0)
- ▶ Distant healing (1)
- ▶ Electric stimulation therapy (32)
- ▶ Magnetic therapy (11)
- ▶ Phototherapy (7)
- ▶ Reiki therapy (2)
- ▶ Therapeutic touch (3)
- ▶ Ultrasonic therapy (11)

▶ Other diet therapies (2)

Dietary supplements (258)

- ▶ Amino acids (20)
- ▶ Enzymes and coenzymes (7)
- ▶ Fats (26)
- ▶ Hormones (10)
- ▶ Minerals (56)
- ▶ Probiotics (23)
- ▶ Vitamins (76)
- ▶ Other supplements (39)
- ▶ Oxygen therapy (5)
- ▶ Ozone therapy (1)
- Herbal Medicine (56)
- ▶ African prune (1)
- ▶ Artichoke leaf (1)
- ▶ Cayenne (1)
- ▶ Cranberry (2)
- ▶ Devil's claw (1)
- ▶ Echinacea (1)
- ▶ Feverfew (1)
- ▶ Garlic (5)
- ▶ Ginkgo biloba (6)
- ▶ Horse chestnut (1)
- ▶ Kava (1)
- ▶ Milk thistle (1)
- ▶ Passiflora (1)
- ▶ Saw palmetto (1)
- ▶ St. John's wort (1)
- ▶ Valerian (1)
- ▶ White willow (1)

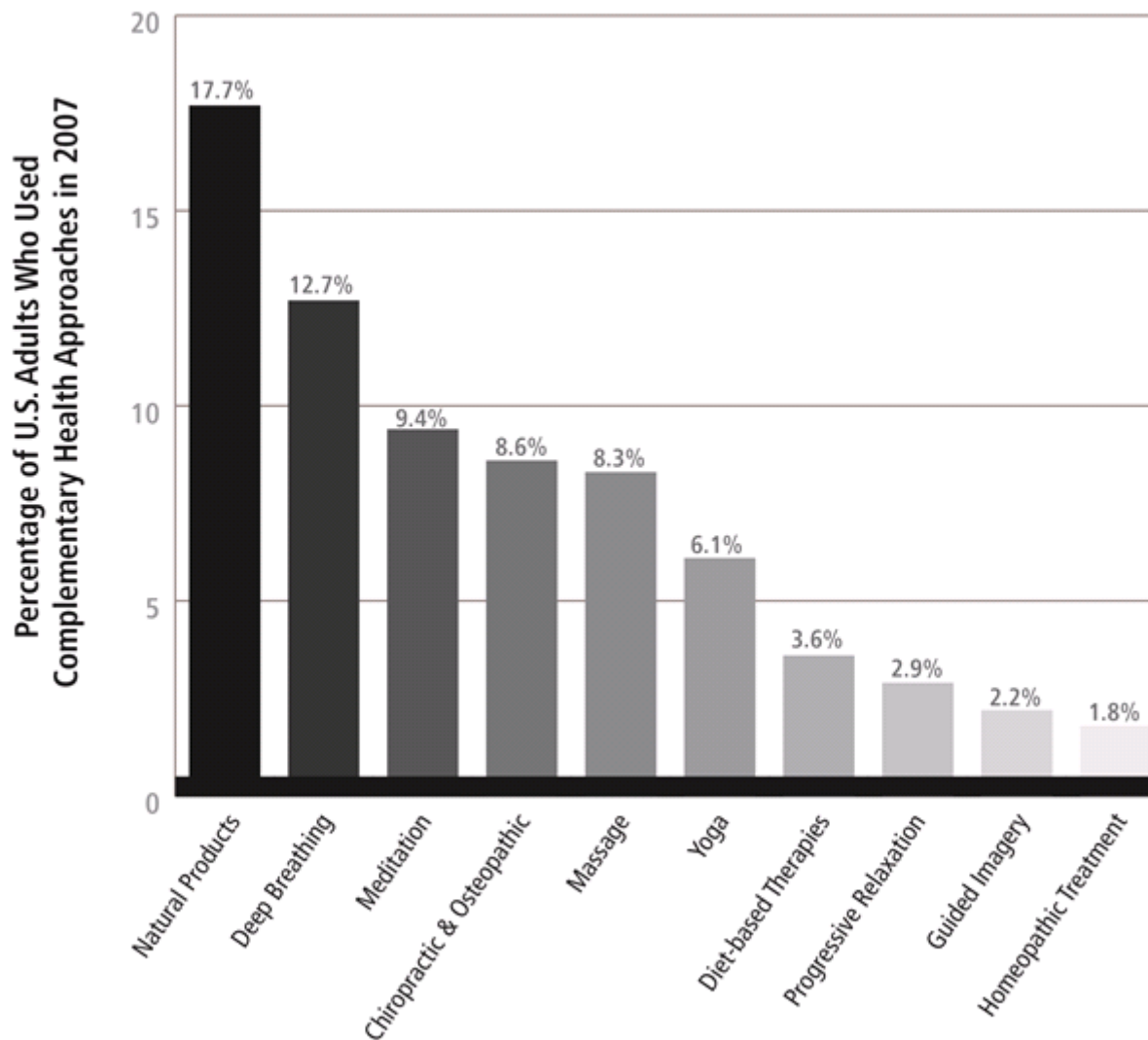
Manipulative and Body-Based Methods (21)

- ▶ Alexander Technique (1)
- ▶ Chiropractic Manipulation/Spinal Manipulation (8)
- Craniosacral Massage (0)
- Feldenkrais Method (0)
- ▶ Massage (10)
- Osteopathic Manipulation (0)
- ▶ Reflexology (2)

Mind-Body Interventions (54)

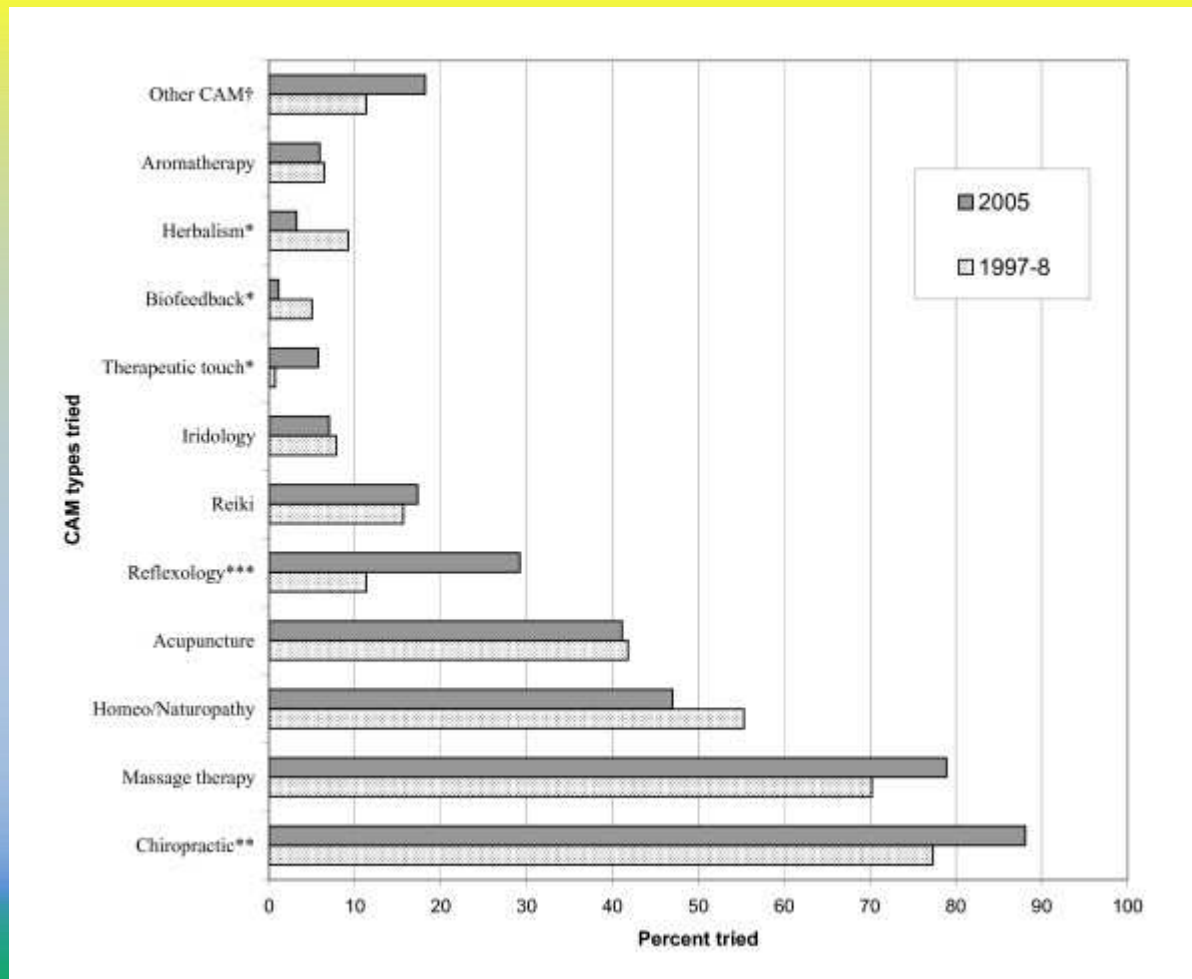
- ▶ Biofeedback (3)
- ▶ Hypnosis (7)
- Imagery (0)
- ▶ Meditation (2)
- ▶ Play therapy (1)
- ▶ Relaxation techniques (7)
- Sensory art therapies (24)
- ▶ Aromatherapy (5)
- ▶ Art therapy (1)
- Color therapy (0)
- ▶ Dance therapy (2)
- ▶ Drama therapy (1)
- ▶ Music therapy (14)
- ▶ Other sensory therapies (1)
- ▶ Tai Chi (5)
- Unconventional psychotherapies (1)
- ▶ Morita therapy (1)
- ▶ Yoga (4)

10 Most Common Complementary Health Approaches Among Adults—2007



Source: Barnes PM, Bloom B, Nahin RL. Complementary and Alternative Medicine Use Among Adults and Children: United States, 2007. CDC National Health Statistics Report #12. 2008.

The use of specific CAM practitioners and products by 1997–8 and 2005 Canadian consumers (Sirois, 2008) (Others include hydrotherapy)

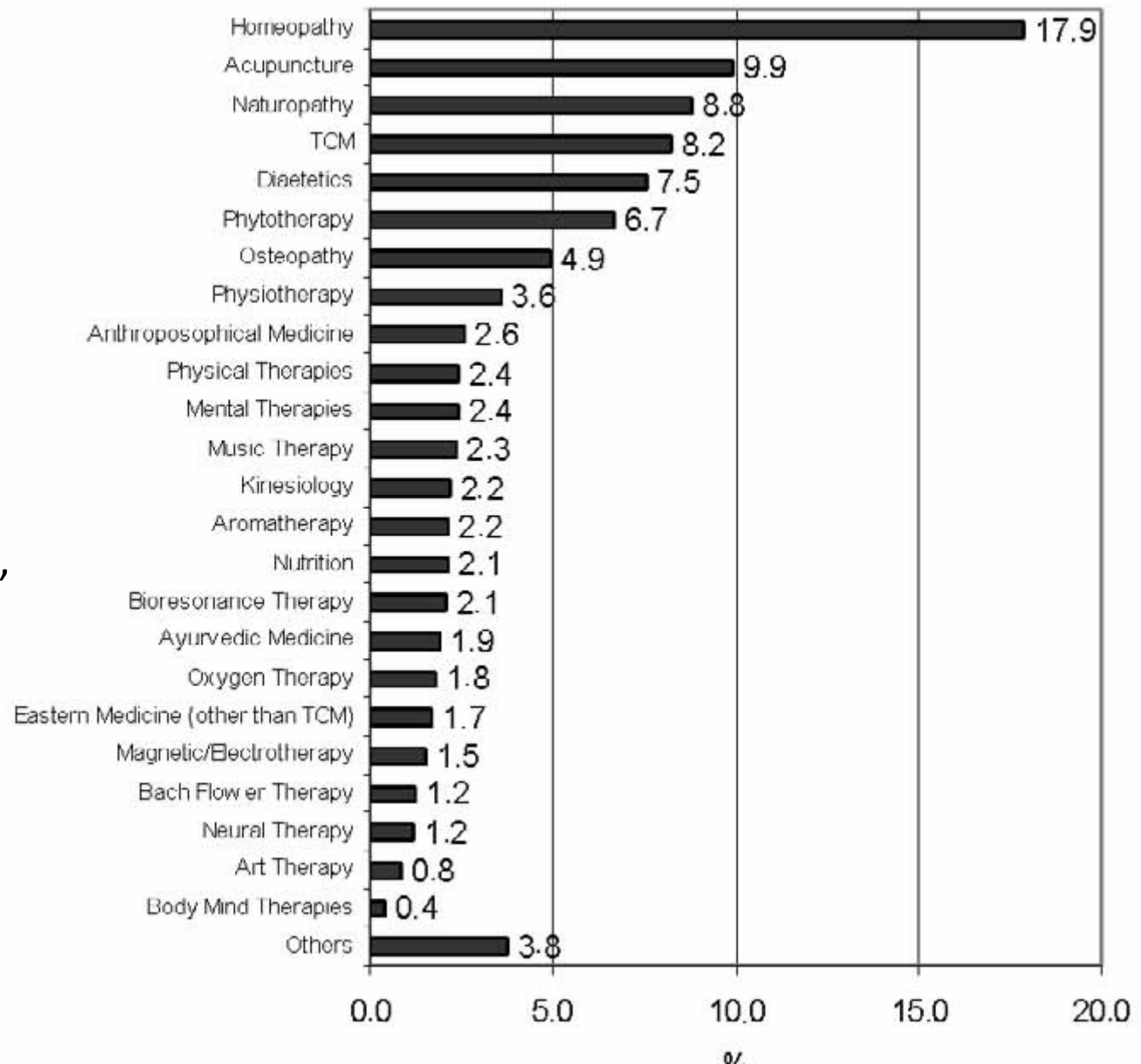


**Most frequently
provided CAM
Disciplines in the EU
27+12
(by end of 2010)
CAMBRELLA, 2013**

CAM discipline		Therapists	non-medical practitioners	MDs (physicians)	MDs + non-medical practitioners	therapists per 100'000 inhabitants
1	acupuncture		16'380	80'000	96'380	21
2	individualised homeopathy		5'250 by March 2013	45'000	50'250	11
3	herbal medicine/ phytotherapy		29'000	??	>29'000	6.5
4	Reflexology		24'600	?	>24'600	5.5
5	naturopathy (GER: "Naturheilverfahren")		7'300	15'000	22'300	5.0
6	antihomotoxicology		20'000	??	>20'000	4.5
7	humoral/drain-off therapy (purgation therapy)		17'000	?	>17'000	3.8
8	kinesiology		7'600	??	> 7'600	1.7
9	shiatsu		7'400	?	> 7'400	1.7
10	orthomolecular therapy		7'000	??	> 7'000	1.5
11	manual therapies (chiropractic, osteopathy)		4'900	??	> 5'000	1.2
12	anthroposophic medicine		(GER: 20)	4'500	4'500	1.0
13	oxygen/ozone therapy		3'000	??	> 3'000	.6
14	Kneipp therapy (GER)		2'500	?	> 2'500	.5
15	Neural therapy (Huneke)		---	1'500	1'500	.3
Total			≈ 159'000 (??)	≈ 145'000 (??)	≈ 304'000 (100%) (??)	65 (?)
Total CAM practitioners per 100'000 EU-inhabitants			35	30	65	
Total GPs per 100'000 EU-inhabitants (population)				95	reference: www.eurostat.eu	

% of 7240
results for
searched
topic:
therapies
in
CAMbase.de
(Ostermann et al.,
2007)

OBS:
NO
HYDROTHERAPY



Uncommon Citations

- WHO = no healthy nature and thermalism
- Pan-European research network for CAM (CAMBRELLA)
- NCCAM (USA)
- IOM (SPA therapy): 2
- MEDLINEPLUS-NIH (SPA therapy): 26
- CLINICALTRIALS.GOV (SPA therapy): 11

CAM unusual or not related?

- Hydrotherapy
- SPA therapy
- Balneotherapy
- Crenotherapy
- Water Cure
- Thermalism
- Kneipp
- Shiatsu

Key words	ncbi.nlm.nih.gov/ pubmed	clinicaltrials.gov	thecochranelibrar y.com	onlinelibrary.wiley	<a href="http://apps.webofknowl
edge.com">apps.webofknowl edge.com	medify.com	pubmed/trials	pubmed/review	pmc
"mineral water"	208	67	310	8018	1405	484	156	52	1569
"mineral spring"			26	704315	257	4			7605
balneotherapy	1070	7	103	9	548	229	598	473	917
"medical hydrology"	107	0	1	12295	24	3	81	38	1701
crenotherapy	296	1	5	5	38	22	8	17	14
hydrotherapy	2651	2575	169	25	1326	3636	1472	1187	2498
balneology	1038	6	116	15	205	263	590	449	722
"health resort medicine"	60	1	72	5	378	317		26	3
climatotherapy		2	14	1	134	88			
"spa therapy"	220	131	44	5	245	139	47	84	3942
"spa water"	611	9	59	3	260		53	36	116
"mineral water" + "biological activity"	11	18		2	14		9	2	22
"mineral water"+"effectiveness"	39	42	13	3	5		9	11	133
"natural water health"	1491	43	47	2	26		56	110	1038



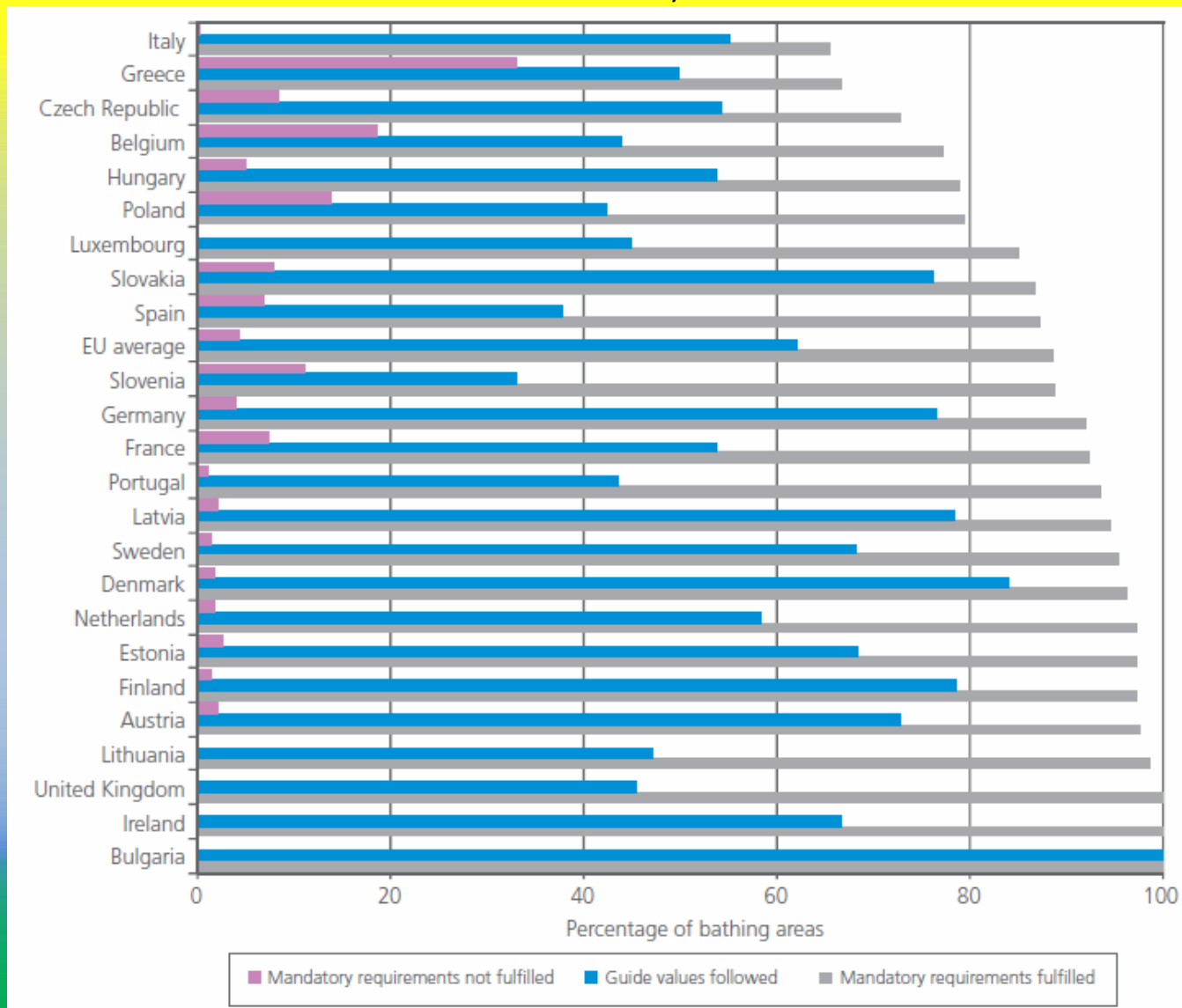
Shiatzu Provision by MD and Non-Medical Practitioners per 100'000
Inhabitants (EU 27+12)

no provision: white ○ | no data: off-white ○ | < 1: light gray ○ | < 5: gray ● | < 10: dark grey ● | > 10: black ●

OBS

- Thermalism places x other CAIM differences
- Brazilian other CAIMs
- Other possible links:
 - Water Cure Associations
 - SPAs Associations
 - . ESPA
 - USA Thermalism Association
 - FLT (Federacion Latino Americana de Termalismo)

Bathing water quality for coastal zones in countries of the EU (WHO-EUROPE, 2010)

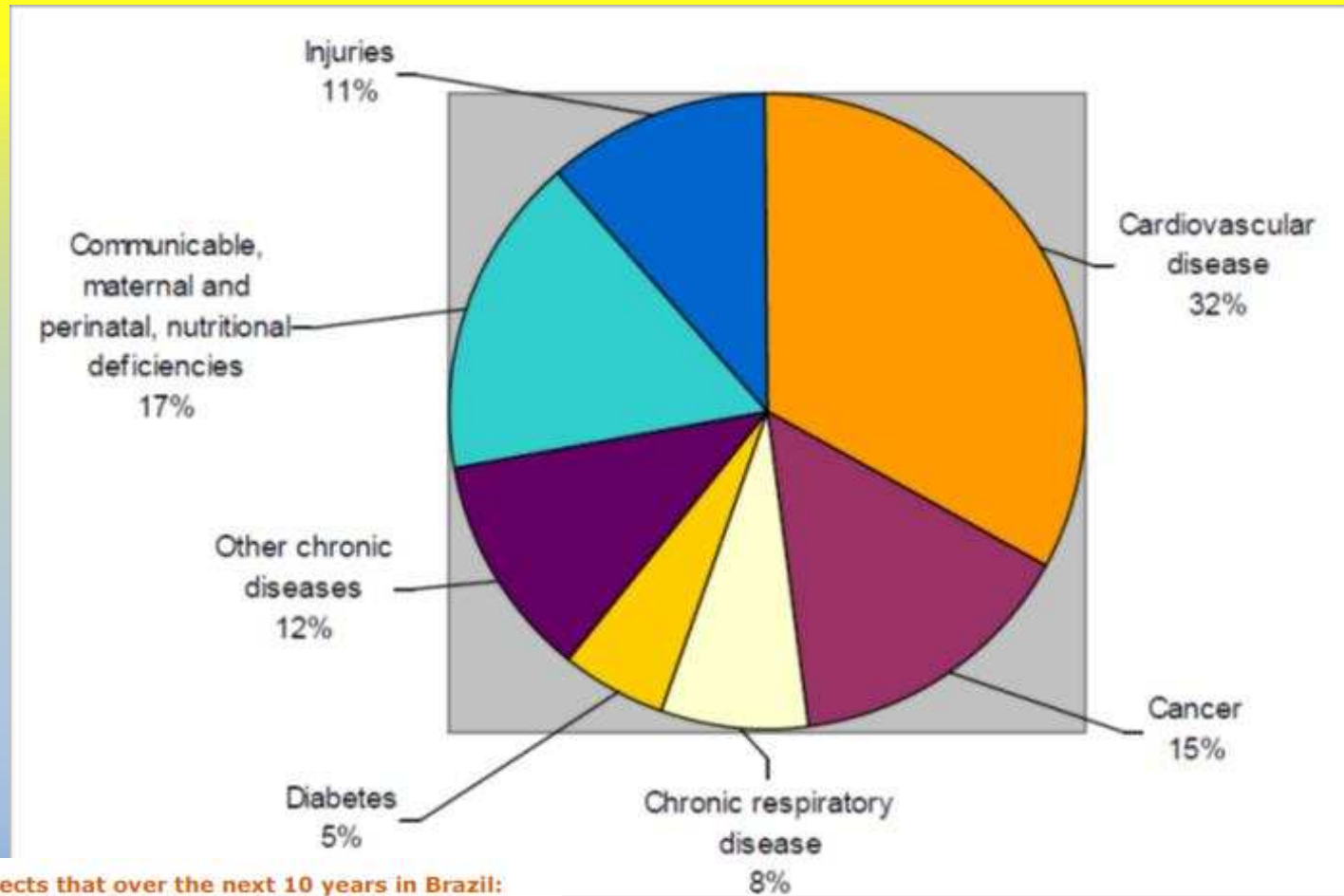


- Brazilian Law 971/2006 including Thermalism like official CAIM (Complementary Alternative Integrative Medicine) in Brazilian SUS Healthcare System (HCS)
<http://www.saude.gov.br/dab>
- Brazilian Crenology Commission

Descriptive measures for the included stakeholders

Stakeholder	Date Established and Time of Operation	Budget estimates**	Financial support	Finances external research	Performs own research
Federal Ministry of Health (MoH), Brazil	1953-	Total CAM investment (2003-2008): €4,740,596	Federal	Yes	Yes
Natural Health Products Directorate (NHPD), Health Canada	2003-08	Total investment (2003-2008): €2,378,010 [NHPD, 2008]	Federal	Yes, ~11.5% of budget for partnership	No
Korean Institute of Oriental Medicine (KIOM)	1994-	€29,149,799 (2011) €19,944,599 (2010) €15,341,999 (2009)	Federal	Yes, ~10% budget goes to external research projects	Yes
National Center for Complementary and Alternative Medicine (NCCAM), National Inst. of Health NIH	1998-	*)€101,260,265 (2011 plan) €98,795,573 (2010); €93,352,232 (2009)	Federal	Yes	Yes
National Institute of Complementary Medicine (NICM)	2007-09	€6,044,748 (2009)	2009: €1,380,780 (federal support), €4,663,968 (universities, other collab. Partners)	No	Yes

Projected deaths by cause, all ages – Brazil (WHO, 2005)



WHO projects that over the next 10 years in Brazil:

- Over 10 million people will die from a chronic disease.
- Deaths from infectious diseases, maternal and perinatal conditions, and nutritional deficiencies combined will decrease by 22%.
- Deaths from chronic diseases will increase by 22% - most markedly, deaths from diabetes will increase by 82%.

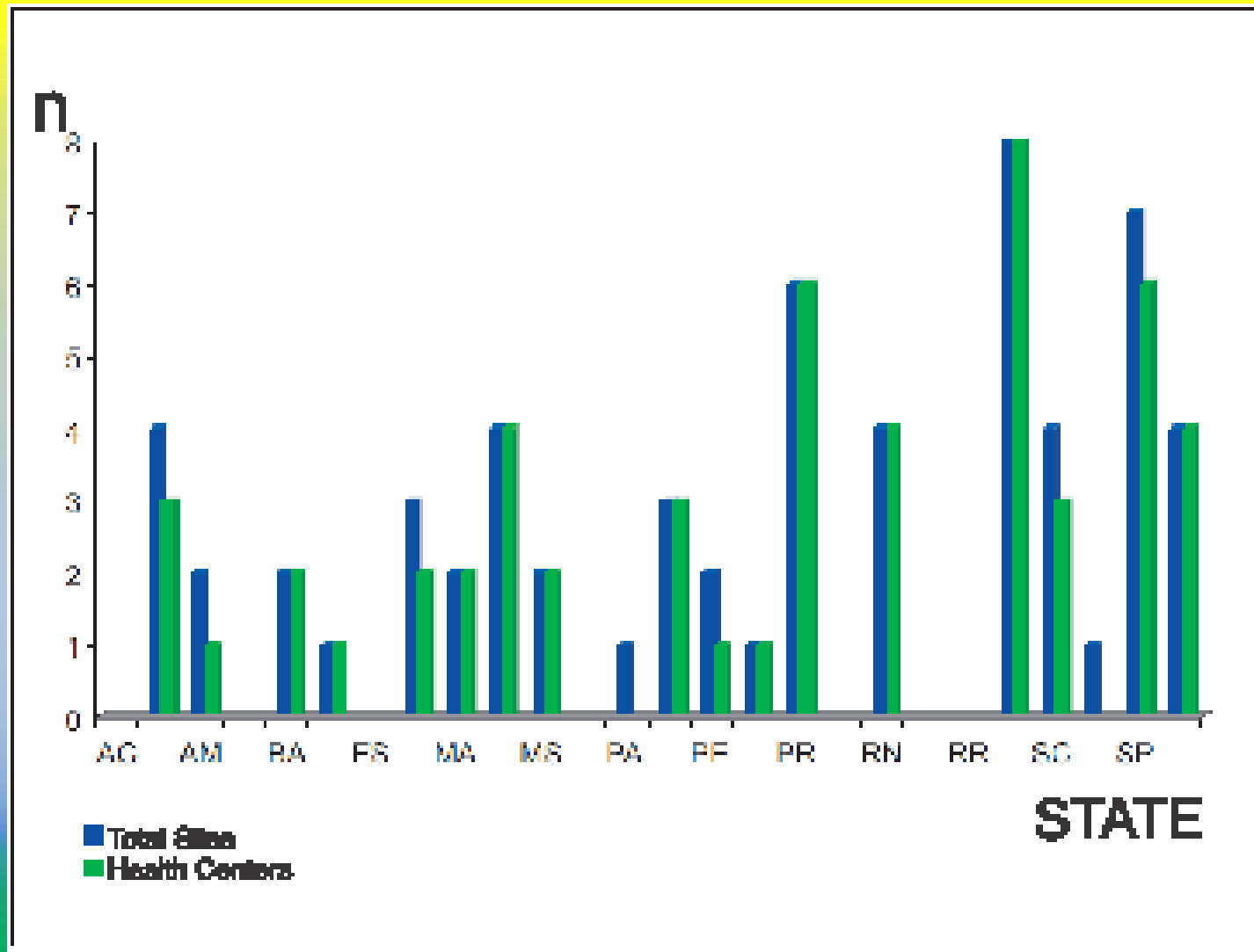
Facts:

- In Brazil, chronic diseases are projected to account for 72% of all deaths (see below).
 - Total projected deaths in Brazil, 2005 = 1,289,000.
 - Total projected deaths due to chronic disease in Brazil, 2005 = 928,000.

There are three primary benefits that may be derived from improved chronic disease management:

- improved health (i.e. quantity and quality of life years gained), experienced by the patient
- long-term cost savings from complications avoided and healthcare utilization reduced, experienced by the plan, the providers and potentially employers
- workplace productivity gains, experienced by patients and their employers.

Brazilian cities with thermalism/hydrotherapy practice (De Simoni et al., 2008)



Number and percentage of health services in complementary and integrative practices (2007-2011) by type of provider

(National Register of Health Service Establishments/Ministry of Health/Brazil <http://cnes.datasus.gov.br>)

Practice Type	Public				Private			
	2007		2011		2007		2011	
	n	%	n	%	n	%	n	%
Acupuncture	93	20	484	15	21	54	255	56
Phytotherapy	28	6	61	2	**	**	8	2
Chinese Traditional Medicine	68	15	376	12	6	15	34	7,5
Body-Based Practices	230	49	2.064	66	3	8	98	22
Homeopathy	38	8	96	3	7	18	47	10
Thermalism/Hydrotherapy	3	1	21	1	1	2,5	4	1
Anthroposophic Medicine	6	1	10	1	1	2,5	7	1,5
Total	466	100	3.112	100	39	100	453	100

Brazilian health trials

- Águas de Lindóia/SP (Taveira & Penachi, 2012): Chronic wounds
- Caldas Novas/GO (Haesbaert, 2013): Chronic wounds
- Rio de Janeiro/RJ (Cantinho & Silva, 2009): Large burns
- Peruíbe/SP (Gouvea, 2011): Gonarthrosis (Mudtherapy)
- Natal/RN (Andrade et al., 2008): Fibromyalgia (Thalassotherapy)
- Presidente Prudente/SP (Liborio & Penatti, 2007): Low back pain
- Araxá/MG (Pires, 2006): Rheumatoid arthritis
- Japi/SP (Nunes & Tamura, 2011): Dermatology
- Guarapari/ES (Mello, 1971): Rheumatology (Psamotherapy – Monazitic)

Past clinical researches in Brazil (almost 100 years ago = traditional medicine?):

- Poços de Caldas, Lambari, Caxambú and Araxá/MG
- Águas de São Pedro, Águas de Lindóia and Ibirá/SP
- Caldas de Cipó/BA

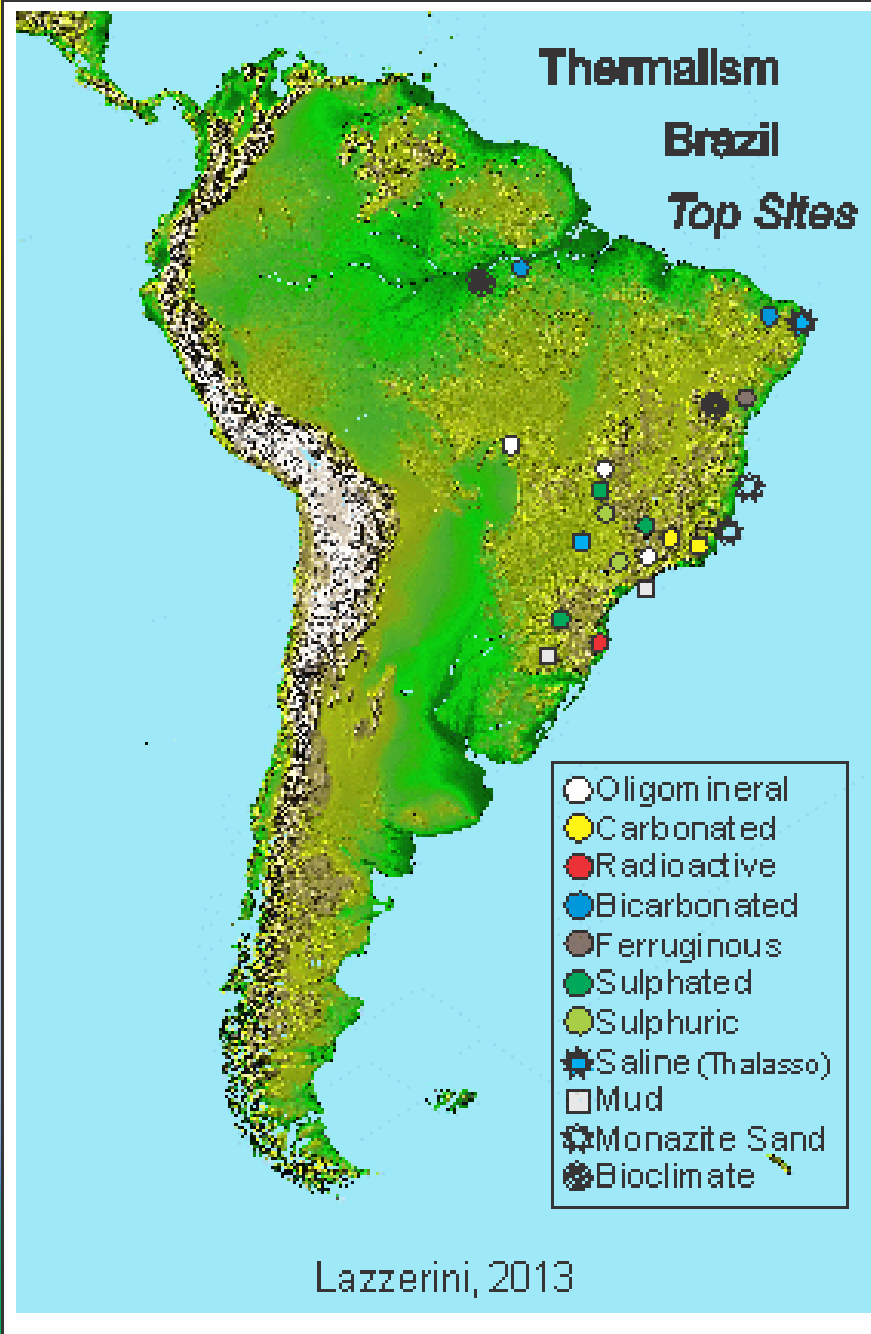
Brazil Features

- Preserved and unexplored natural endowment
- Tropical and diversified bioclimates
- Healing natural resources:
 - Mineral Springs (Hydrodiversity)
 - Safe special mud and clay
 - Hot Thalassotherapy places
 - Monazite Sand
 - Amazon evapotranspiration and biodiversity
- Promised Economy and Consumer Market
- Favorable people acceptance to CAM
- Current government support and interest in this CAM
- Medical Tourism
- Obvious need for increased scientific knowledge about these kind of clinical trials

ESTÂNCIAS HIDROMINERAIS – Brazil (EMBRATUR, 2002)

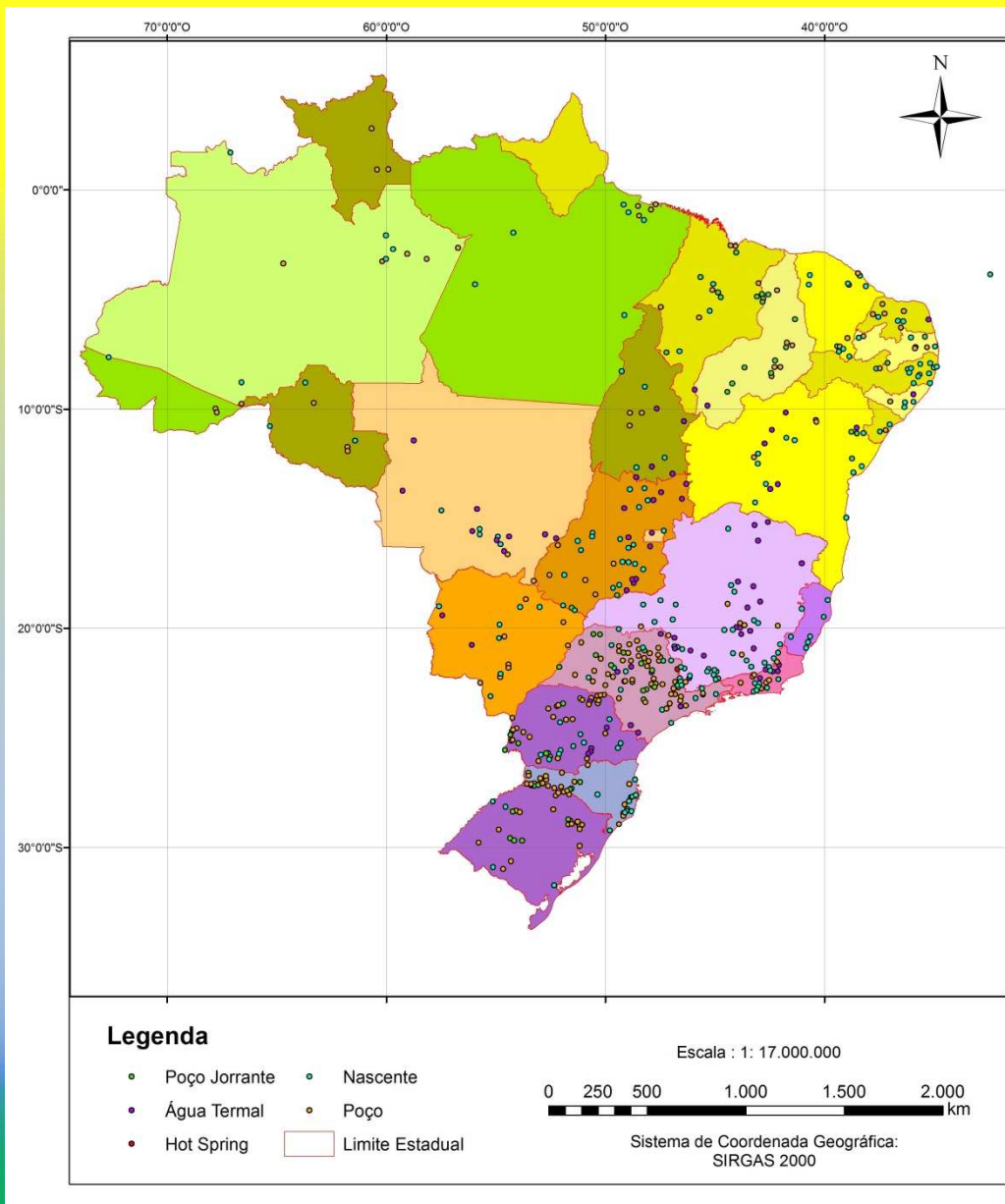
#	UF	MUNICIPIO	N
1	GO	Caldas Novas, Pirapitinga e Rio Quente	71,72,350
2	MG	Araxá	26
3	MG/SP	Águas da Prata/SP, Caldas (Pocinhos Rio Verde) e Poços de Caldas	1,70,326
4	MG	Cambuquira, Caxambú, Lambari e São Lourenço	74,96,227,393
5	RJ	Paraíba do Sul, Três Rios	293,429
6	RJ	Itaperuna (Raposo), Santo Antonio de Pádua	199,372
7	SP	Águas de Lindóia, Amparo, Lindóia, Monte Alegre do Sul, Serra Negra, e Socorro	3,15,230,258,408,413
8	SP	Ibirá	170
9	SP	Águas de Santa Bárbara	4
10	SP	Paraguaçu Paulista	292
11	PR	Mallet	241
12	SC	Gravatal, Santo Amaro da Imperatriz e Tubarão	160,371,432
13	RS/SC	Marcelino Ramos/RS, Piratuba/SC	244,320
14	SC/RS	Águas de Chapecó/SC e Iraí e Vicente Dutra/RS	2,180,445
15	BA	Cipó	103
16	SE	Salgado	355
17	PB	São João do Rio do Peixe	387

Thermalism Brazil Top Sites



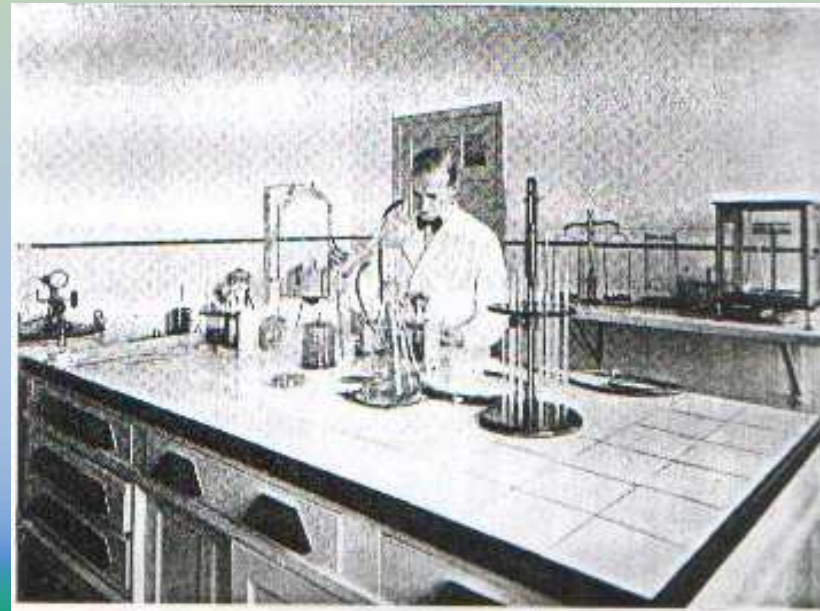
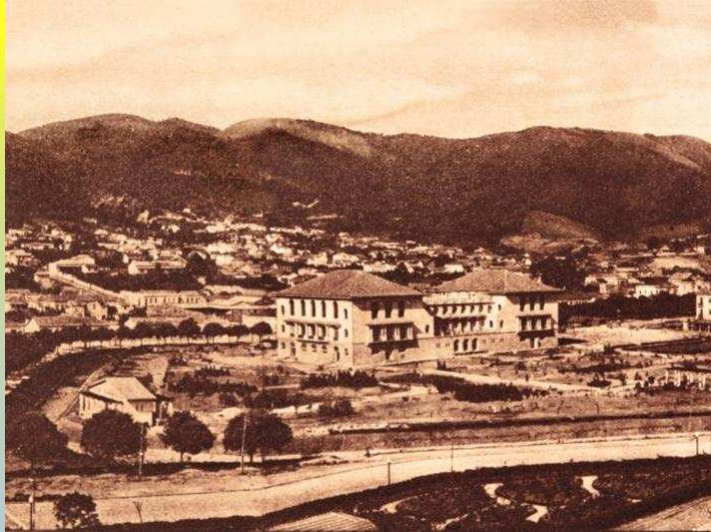
Lazzerini, 2013

700 Springs Brazil



Fontes Hidrominerais - *SPRINGS BRASIL*





Araxá - MG



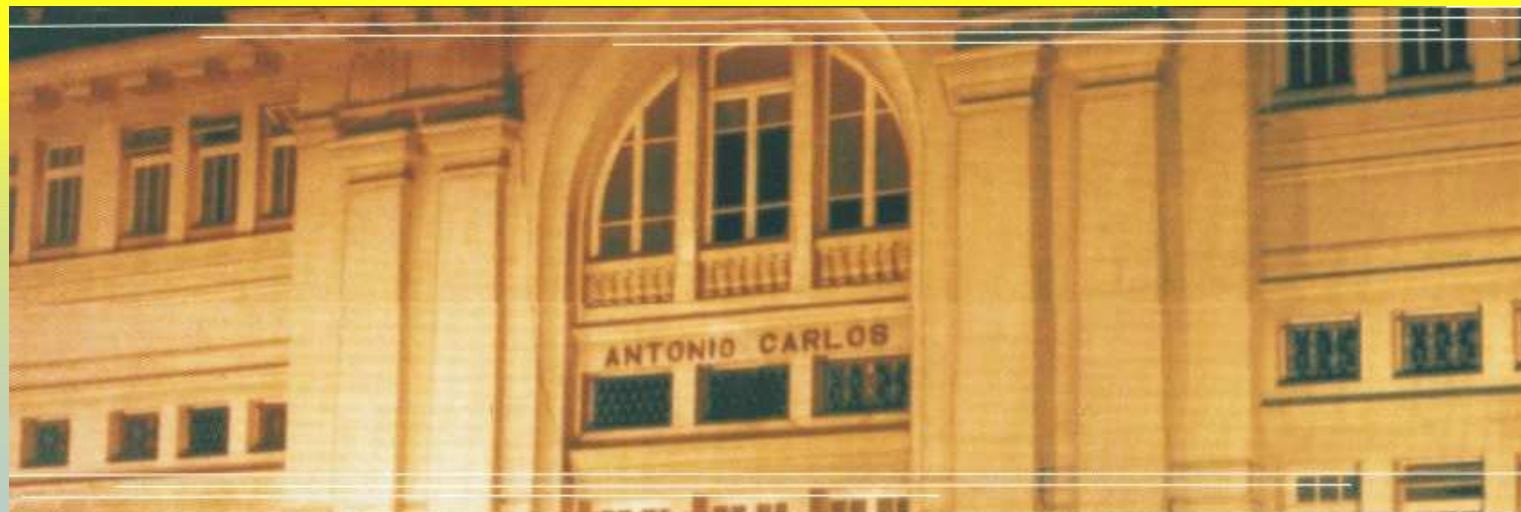
Águas de São Pedro - SP



Cipó - BA



Poços de Caldas - MG



Caxambú - MG



Ibirá - SP



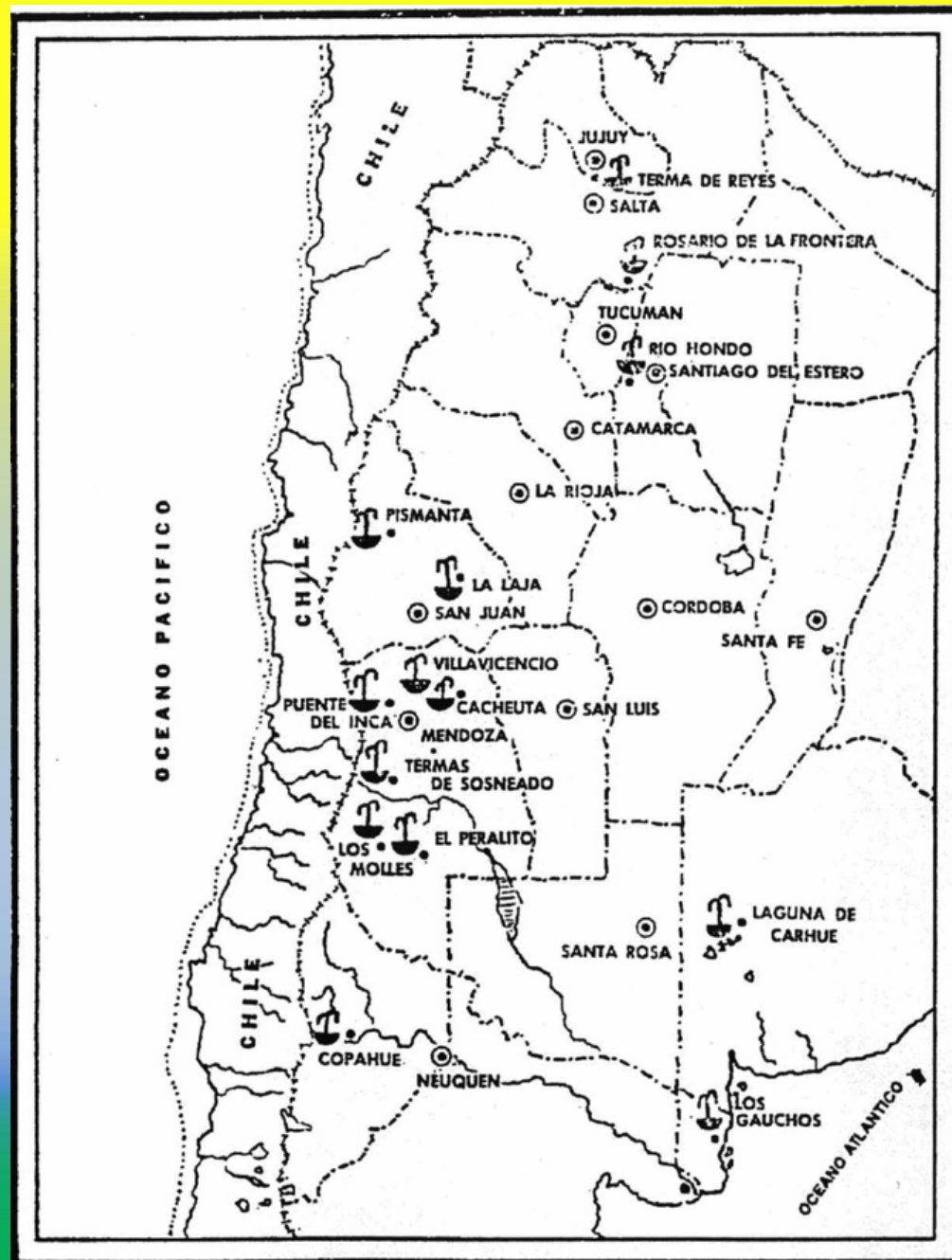
Fernandópolis



Lamas Negras Brasil

Itacaré, Peruibe, Comandatuba, Morro de São Paulo...





Brazilian bottled water monuments

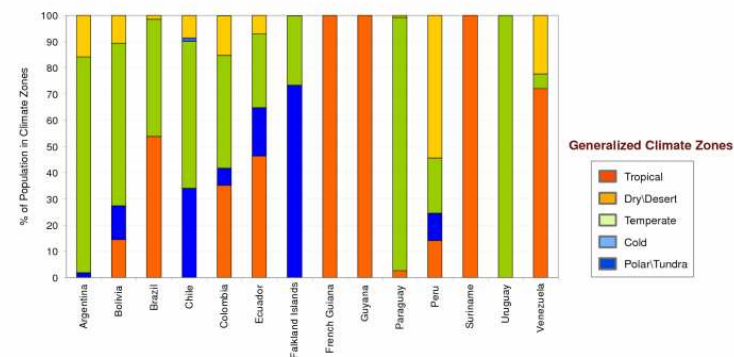


Brazilian Behavior

- 55% tropical
- 45% temperate
- 5% semi-arid (PLACE, 2007).

Climate Zones

South America



The map of South America and the bar chart provide a comparison of climate data from two related sources. The map data are climate zones from the Köppen Climate Classification map of the world. The chart data are the percent population living in these climate zones from the PLACE dataset.



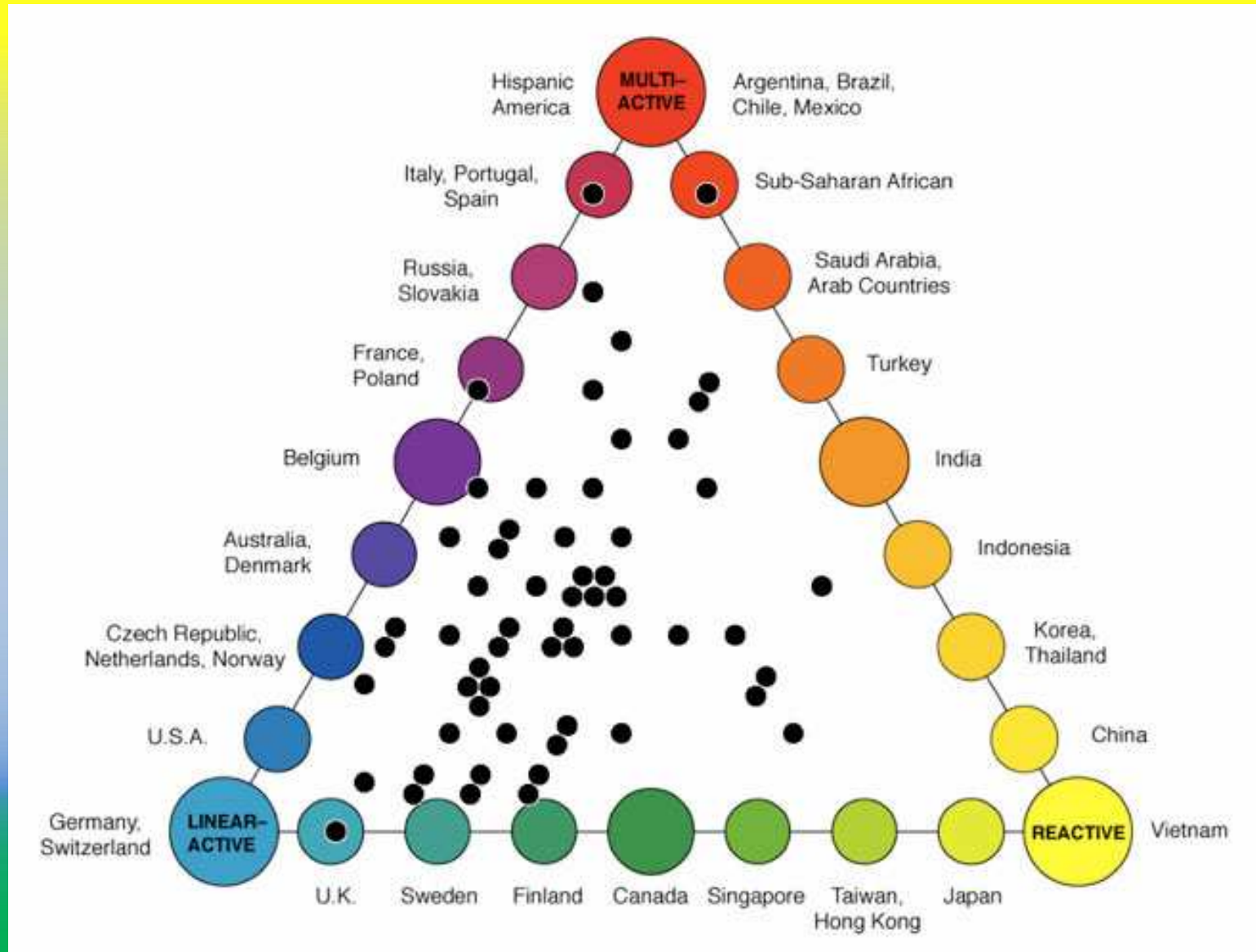
Copyright 2007, The Trustees of Columbia University in the City of New York.
 Source: Center for International Earth Science Information Network (CIESIN),
 Columbia University, Population, Landscape, and Climate Estimates (PLACE).
 Further information available at: <http://sedac.ciesin.columbia.edu/place/>

Publish Date: 02/23/07



This document is licensed under a Creative Commons Attribution License

Multi-active index - Lewis Model of Culture for encouraging effective intercultural communication (<http://www.crossculture.com>)



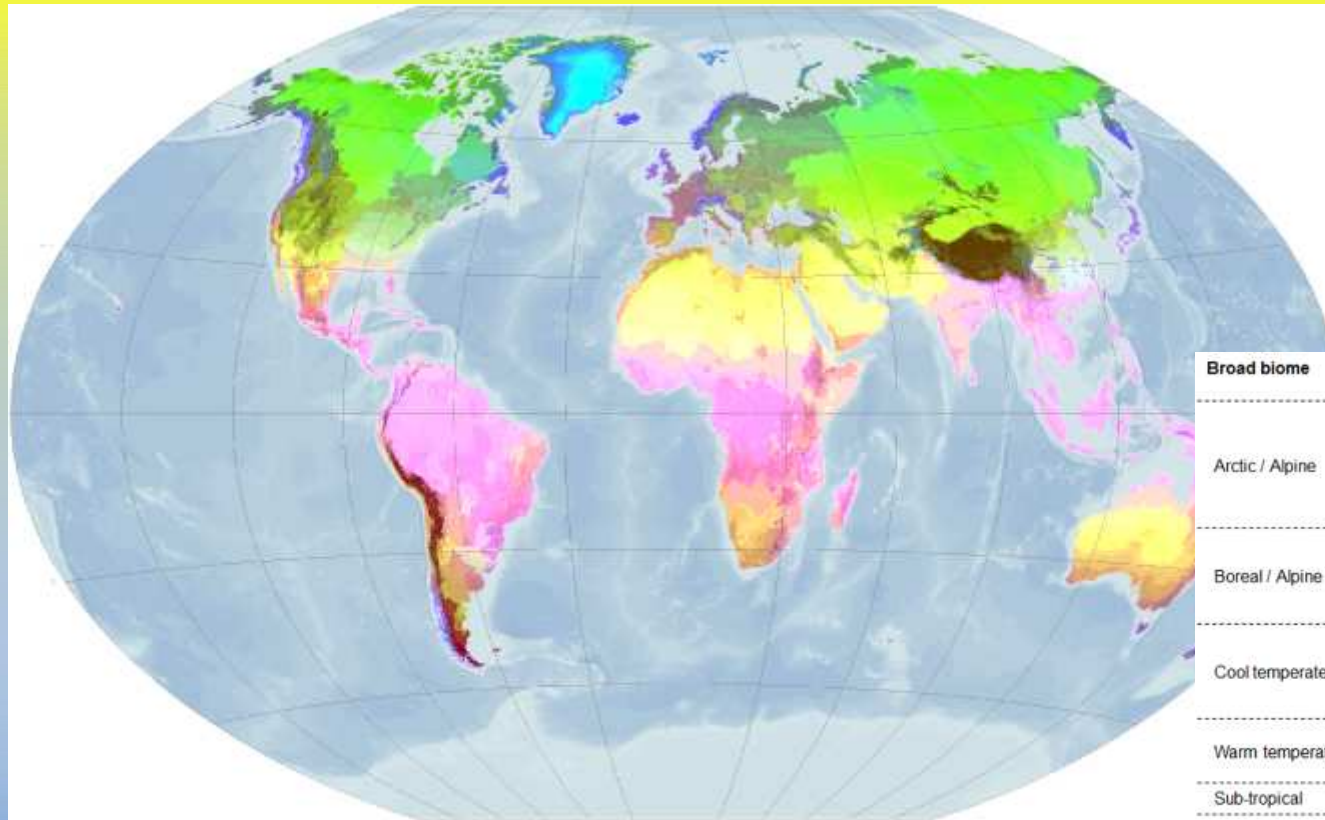
Amazon Geodiversity



TROPICAL THALASSOTHERAPY – BARRA GRANDE - BA - BRAZIL



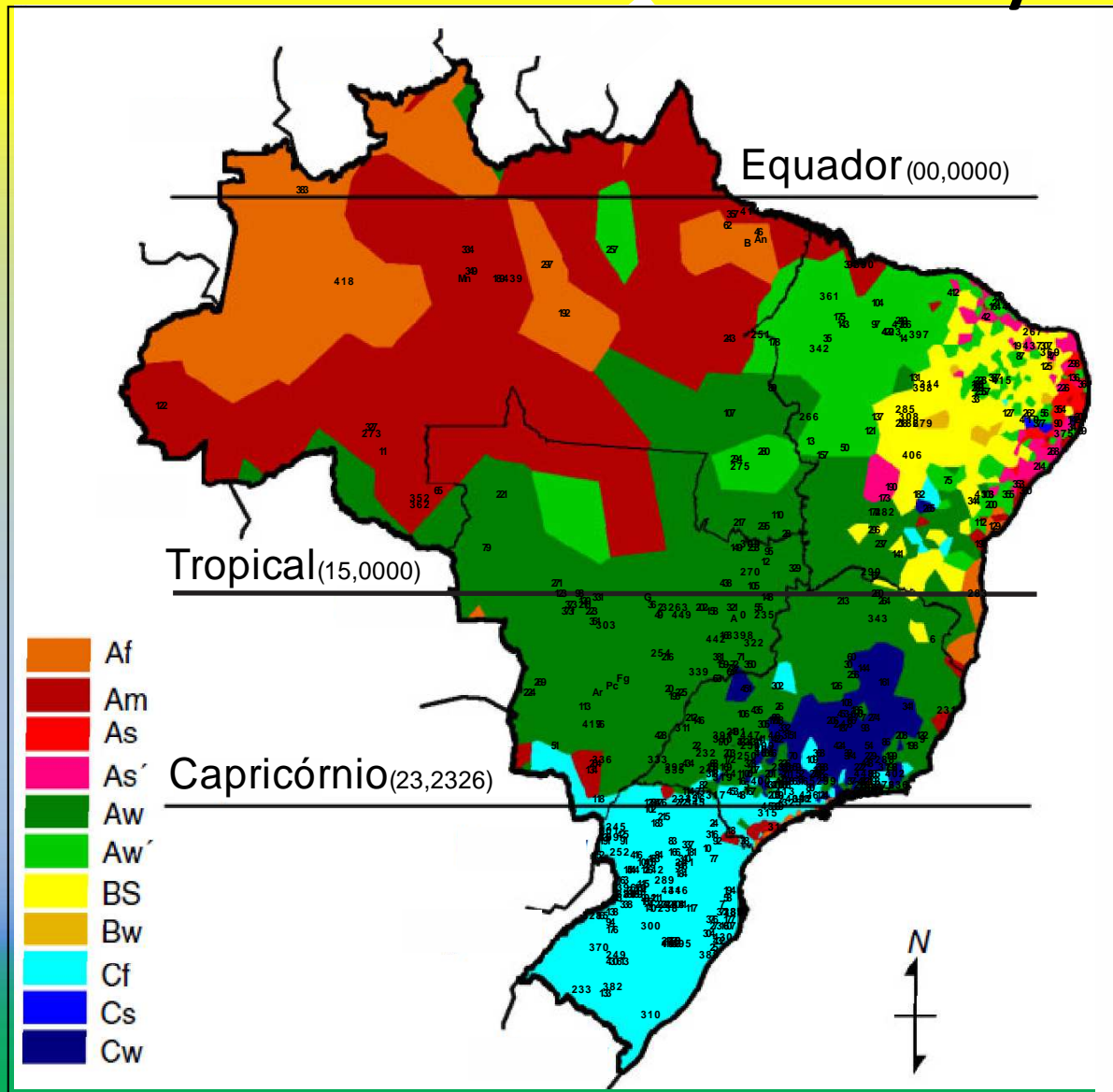
A high-resolution bioclimate map of the world: a unifying framework for global biodiversity research and monitoring (Metzger et al., 2012)



Broad biome	Global Environmental Zones	# strata in the zone
Arctic / Alpine	A. Arctic 1	2
	B. Arctic 2	3
	C. Extremely cold and wet 1	3
	D. Extremely cold and wet 2	3
Boreal / Alpine	E. Cold and wet	5
	F. Extremely cold and mesic	15
	G. Cold and mesic	14
Cool temperate	H. Cool temperate and dry	9
	I. Cool temperate and xeric	6
Warm temperate	J. Cool temperate and moist	6
	K. Warm temperate and mesic	13
Sub-tropical	L. Warm temperate and xeric	6
	M. Hot and mesic	8
Drylands	N. Hot and dry	11
	O. Hot and arid	3
	P. Extremely hot and arid	2
Tropical	Q. Extremely hot and xeric	6
	R. Extremely hot and moist	10

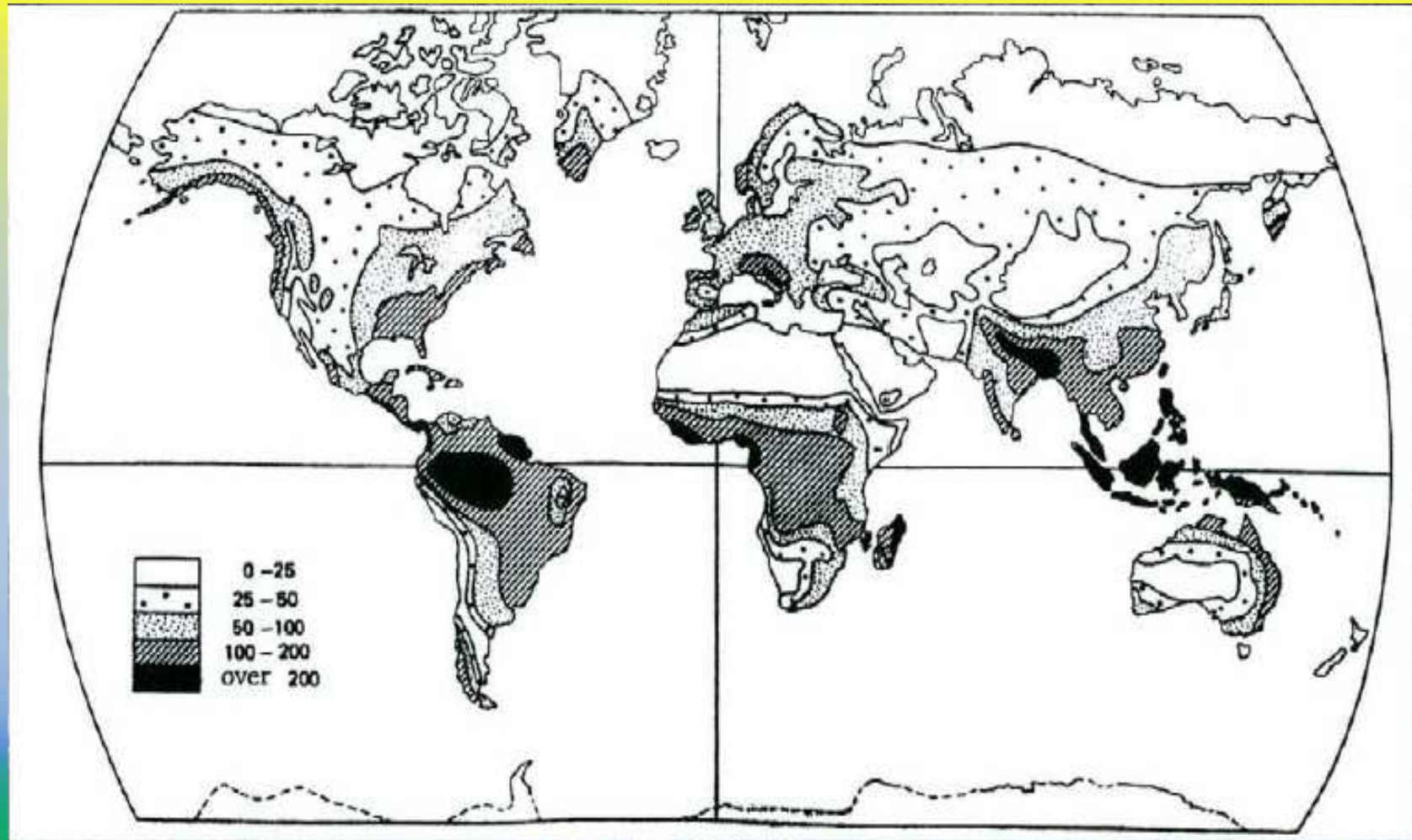
Similar Dissimilar

Climate-diversity

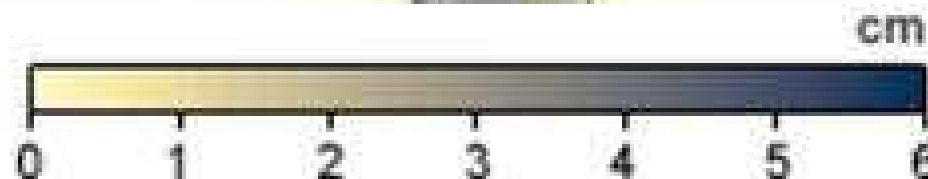
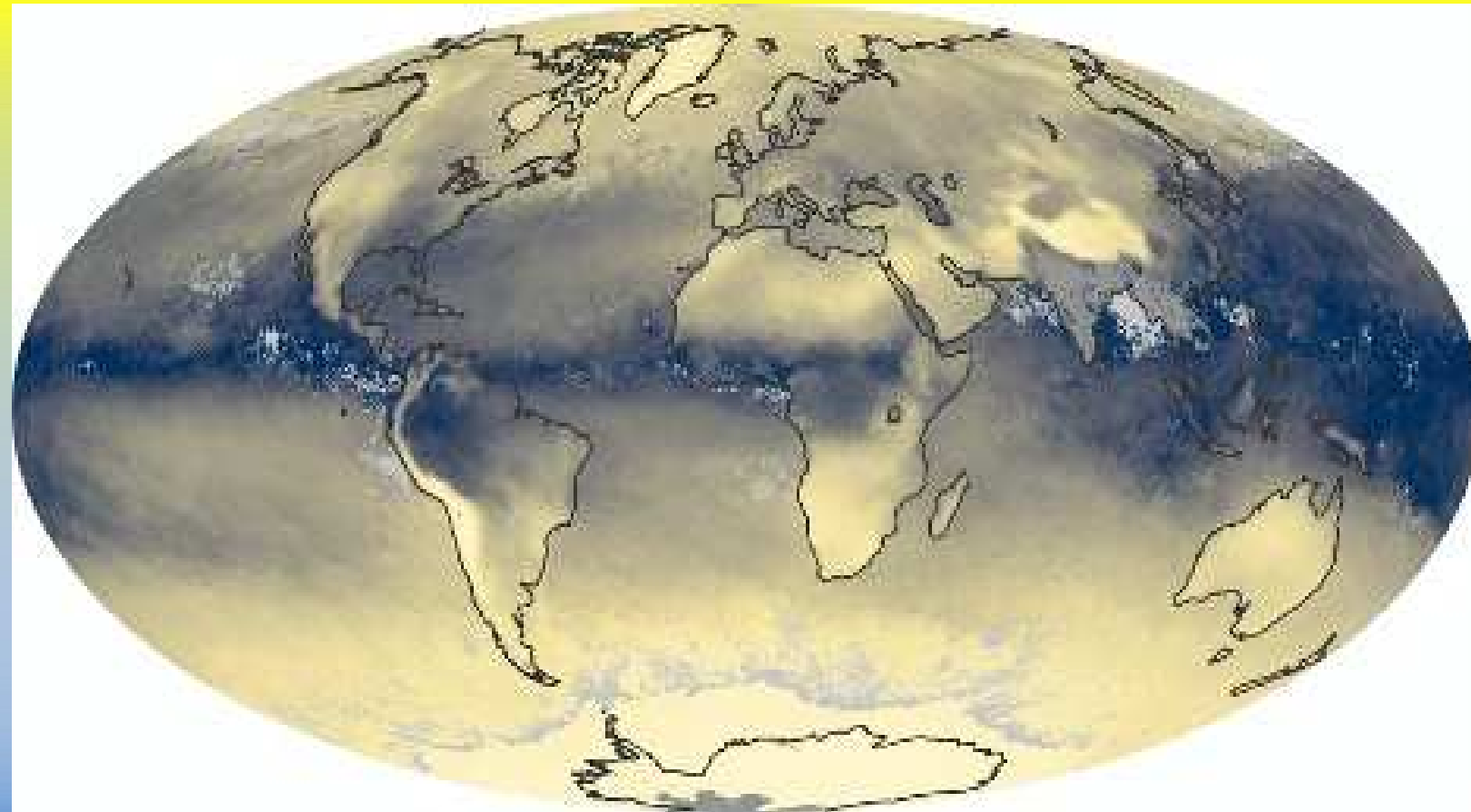


Average distribution of precipitation in the Earth

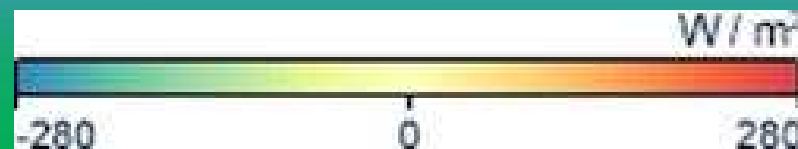
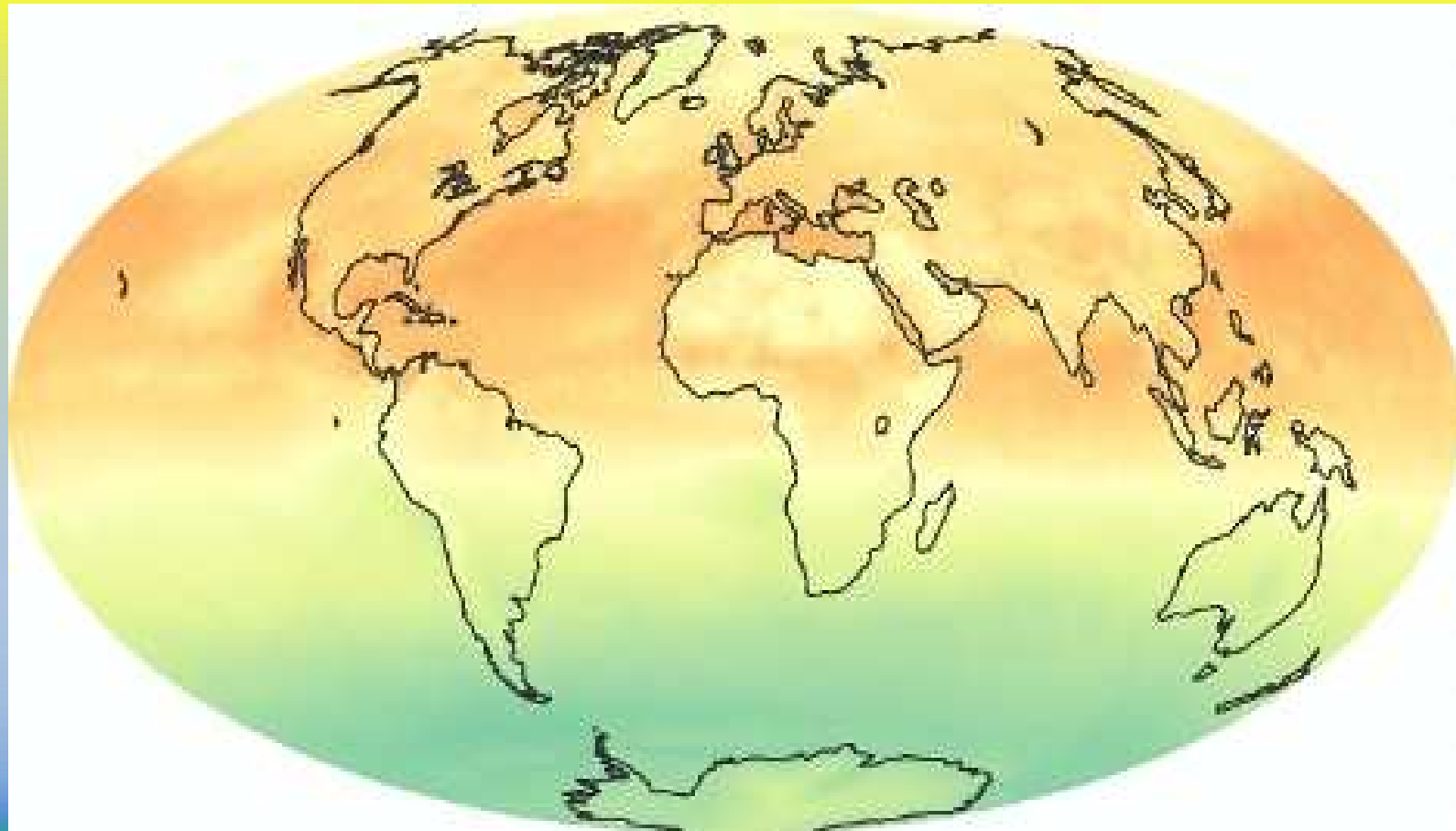
(average values of precipitation height, in cm)



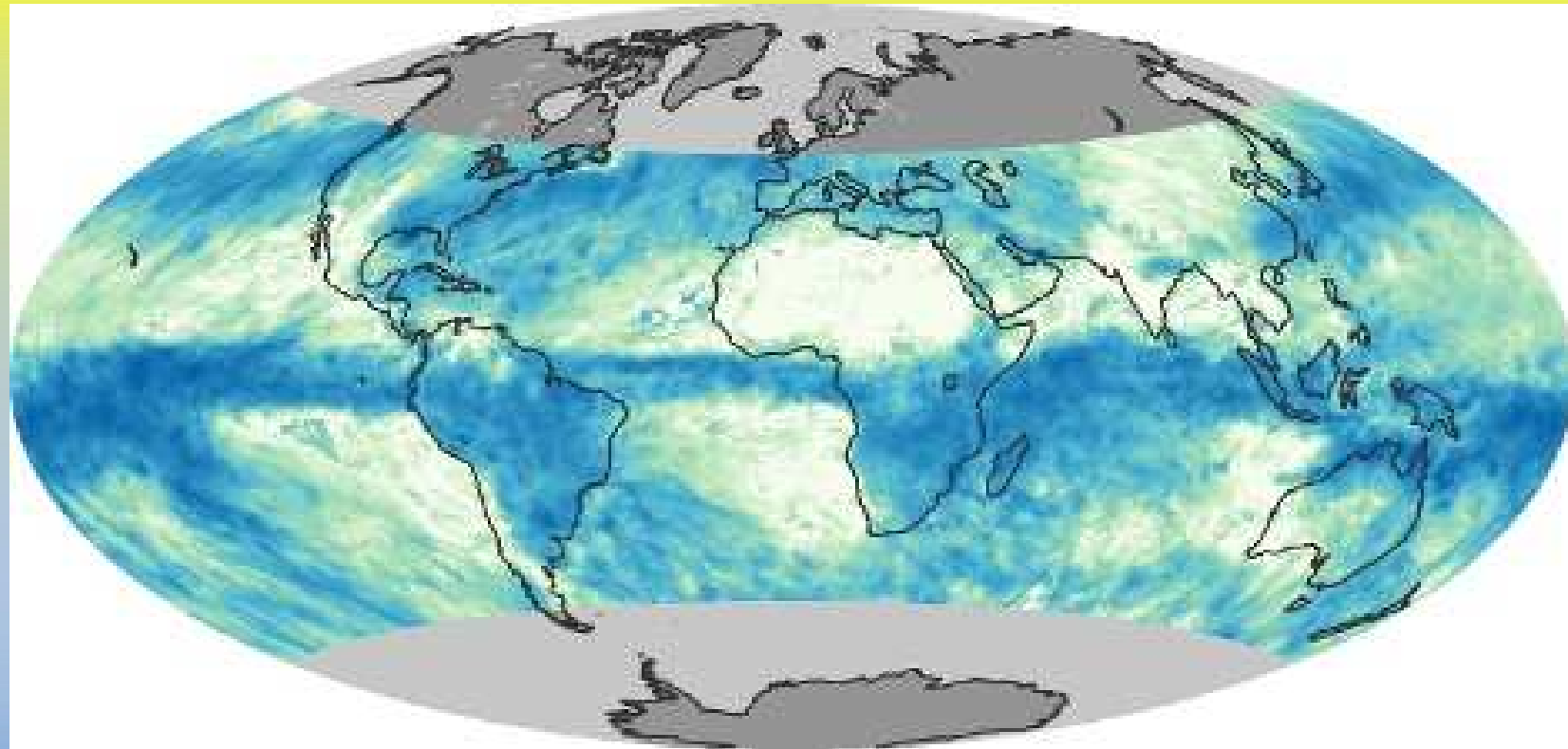
Water Vapor (<http://earthobservatory.nasa.gov> - 2002)



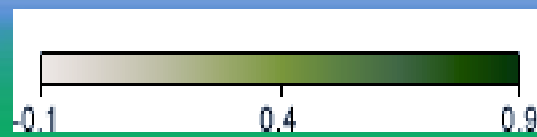
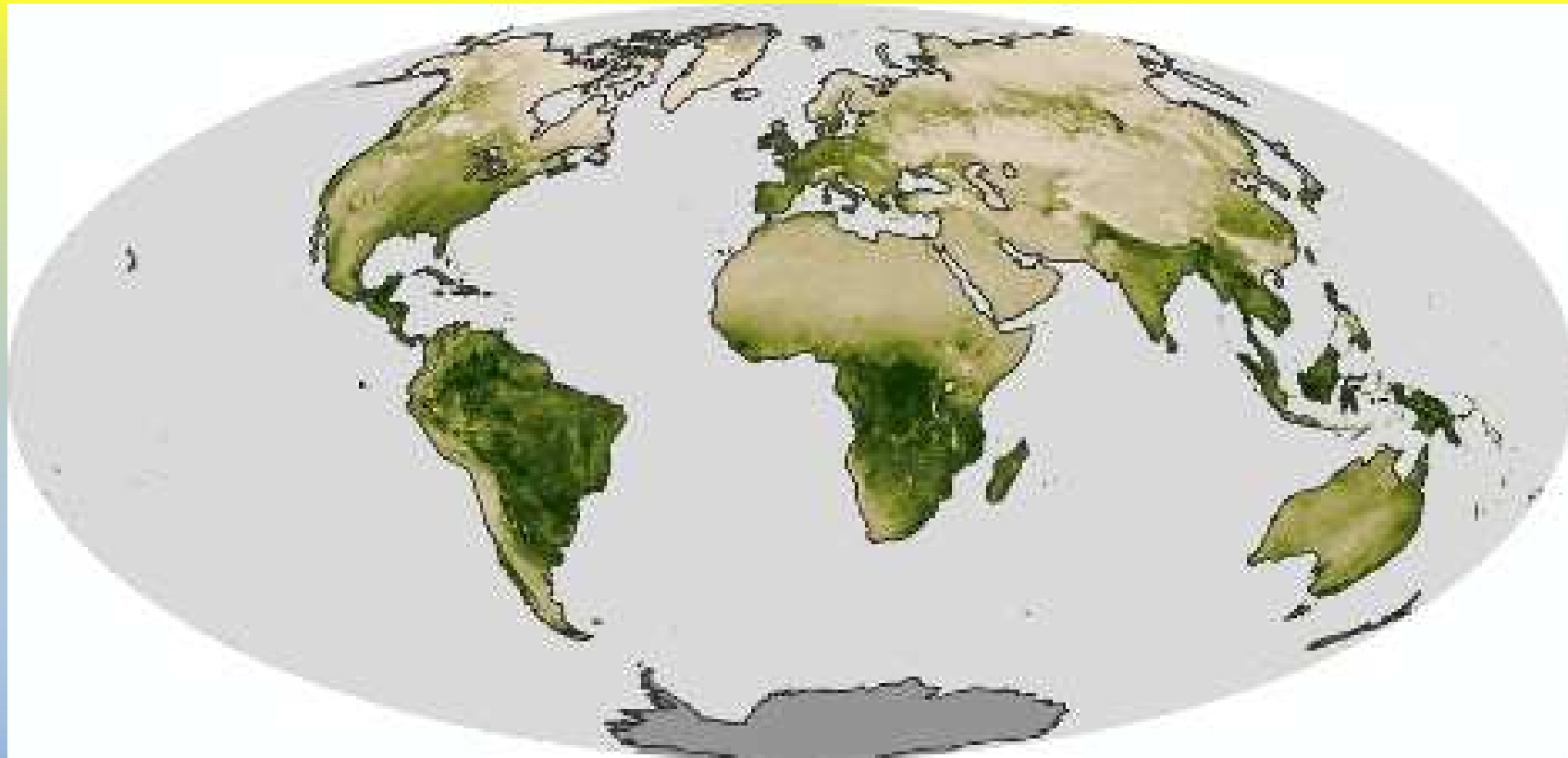
Net Radiation



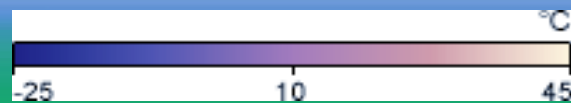
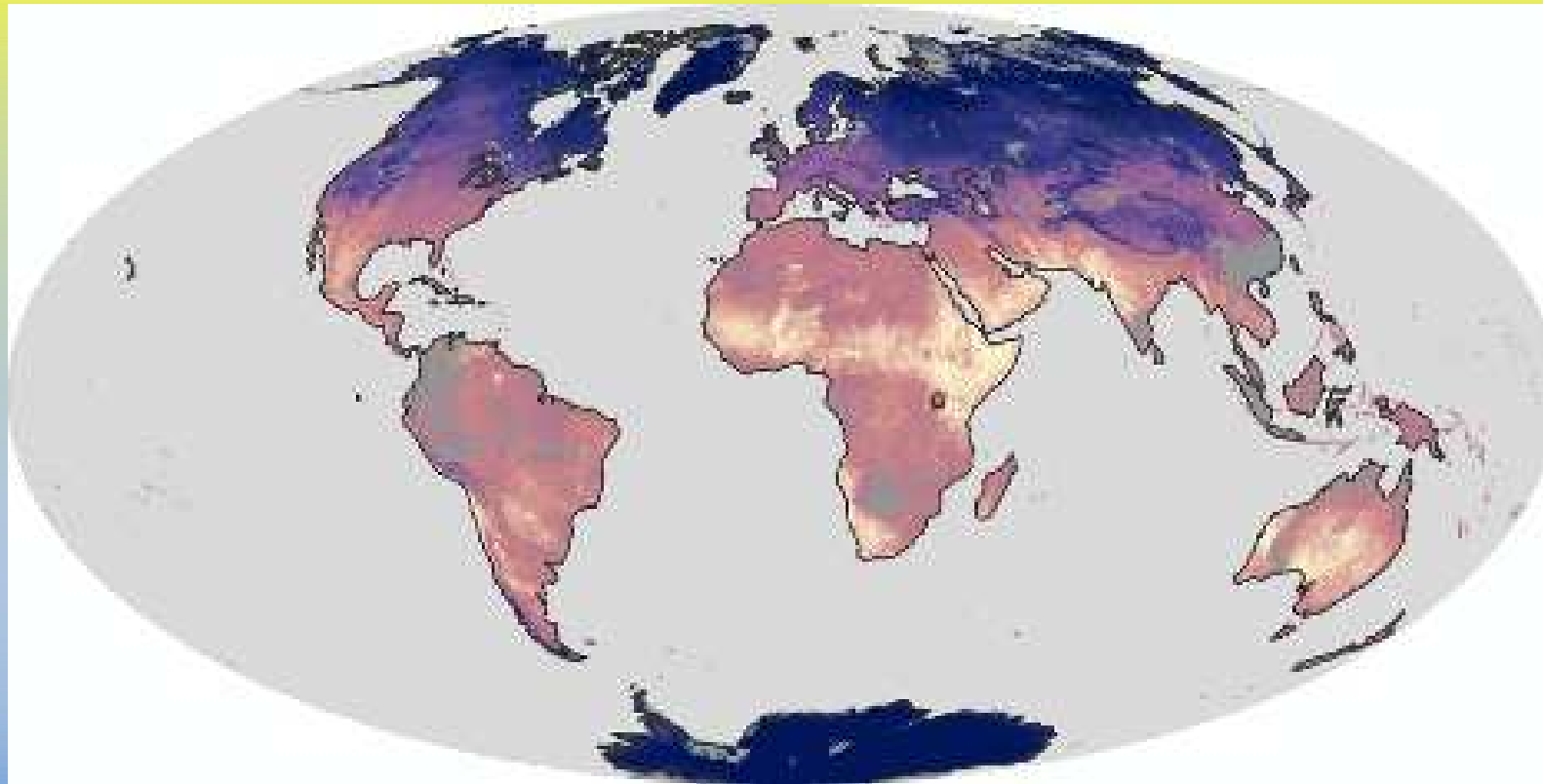
Total Rainfall



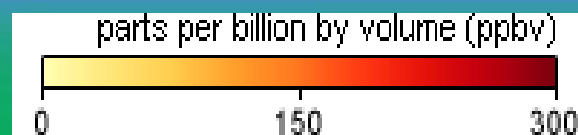
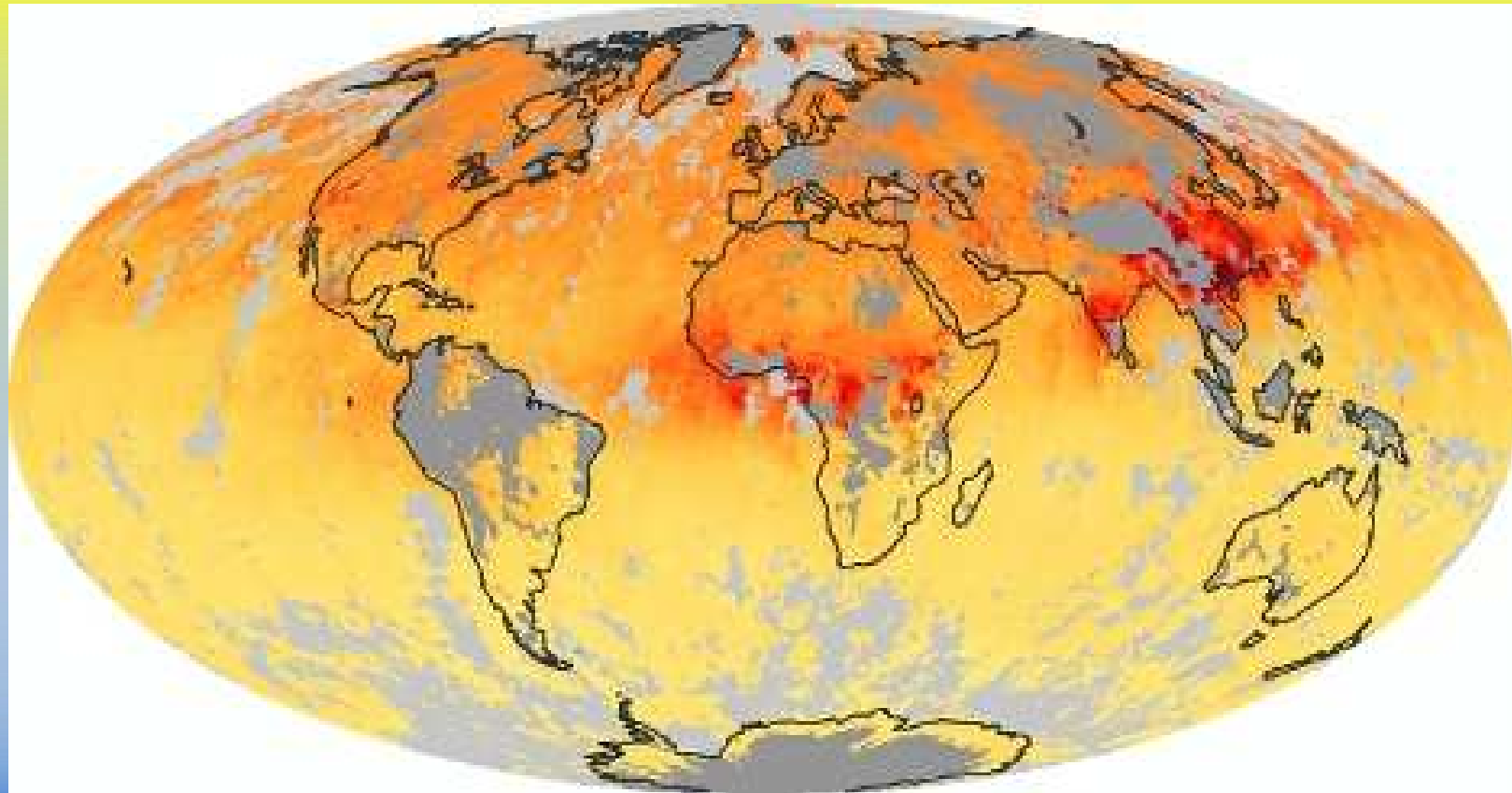
Vegetation



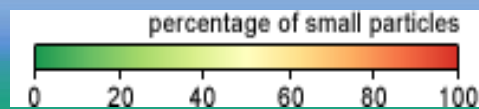
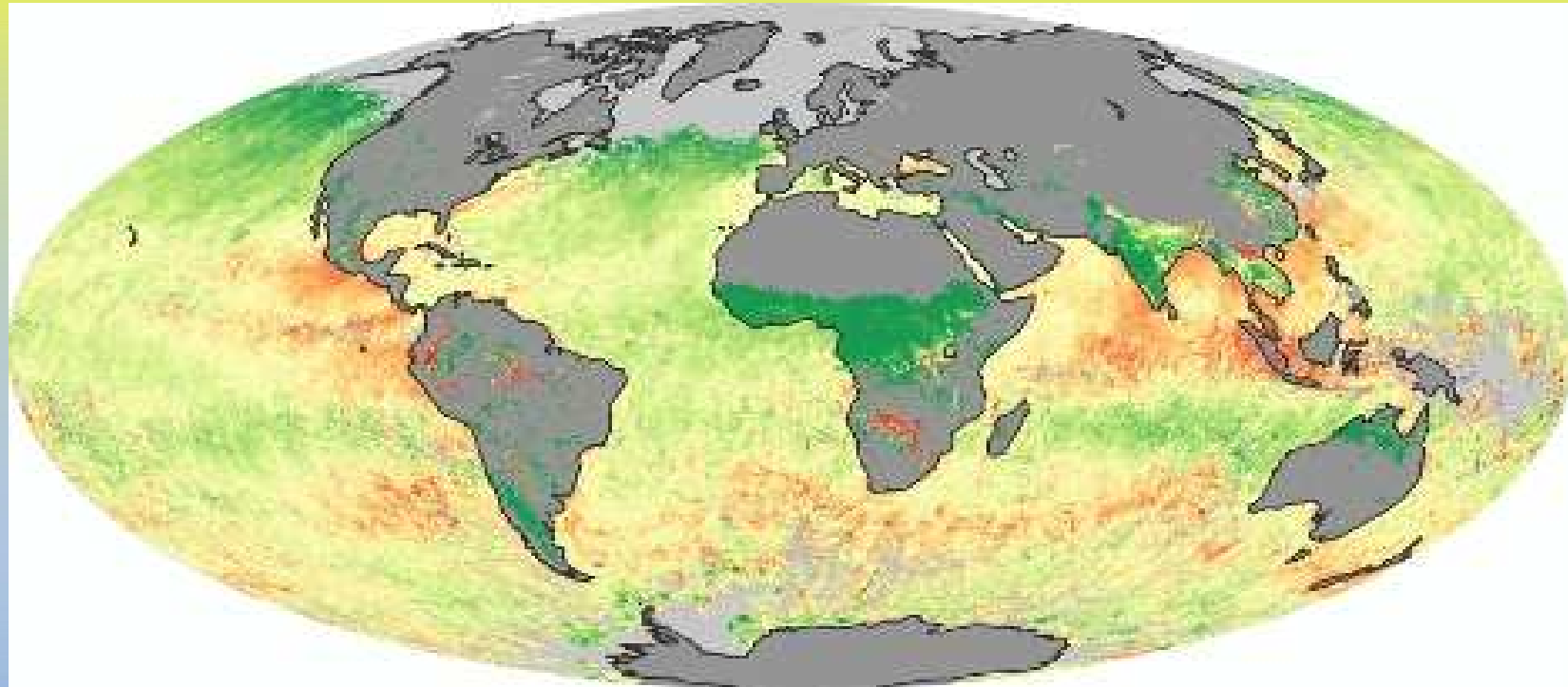
Land Surface Temperature

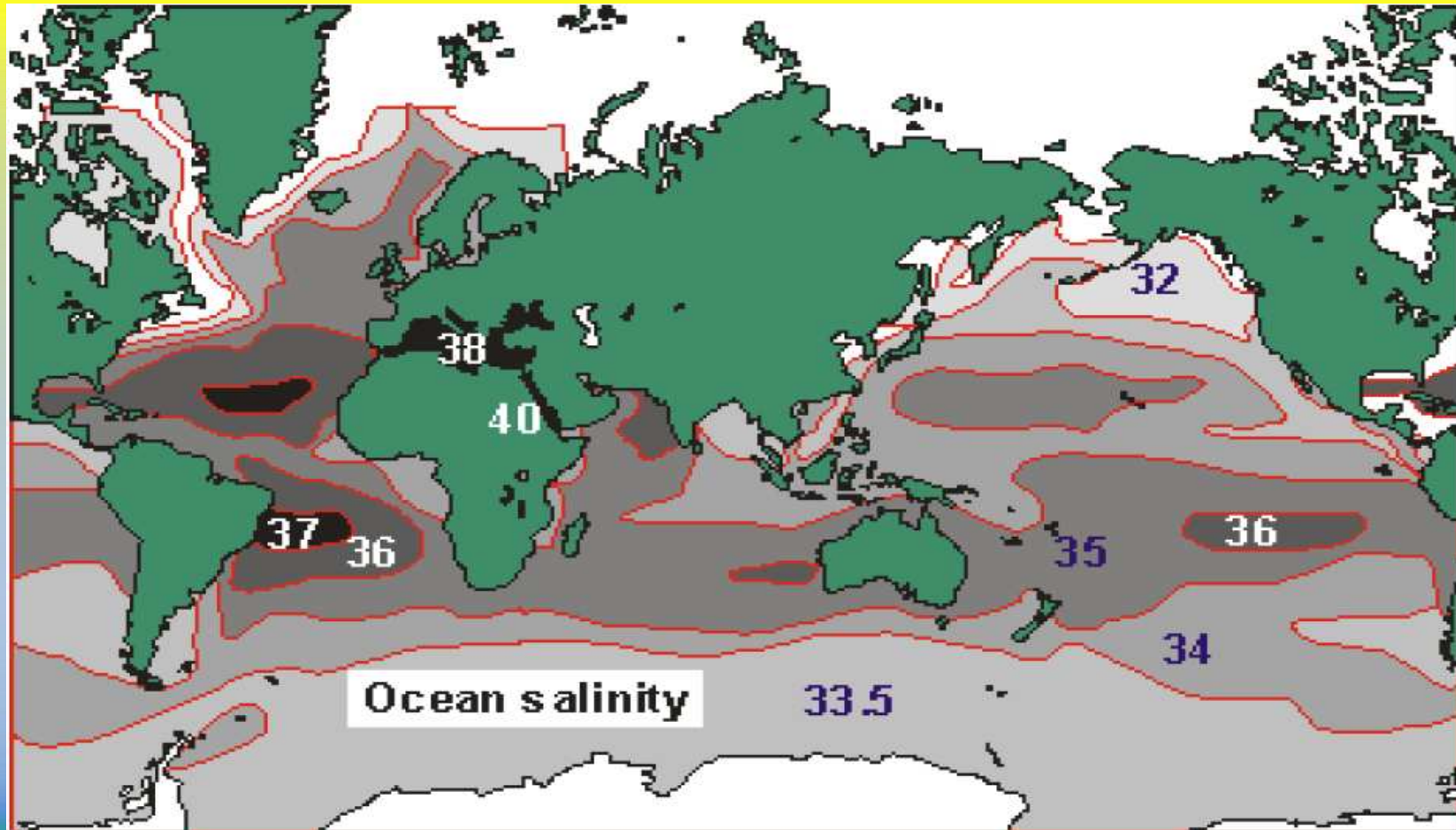


Carbon Monoxide

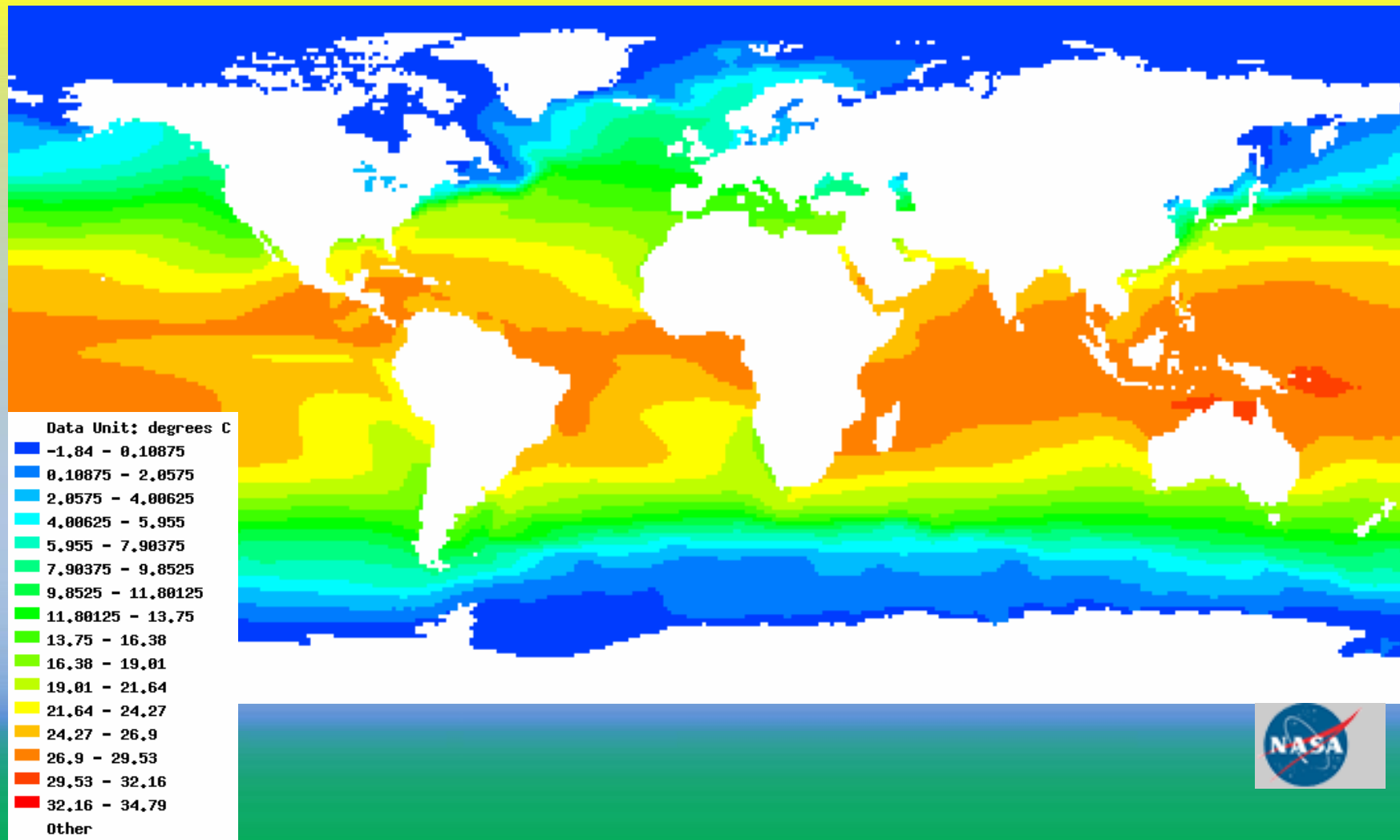


Aerosol Size

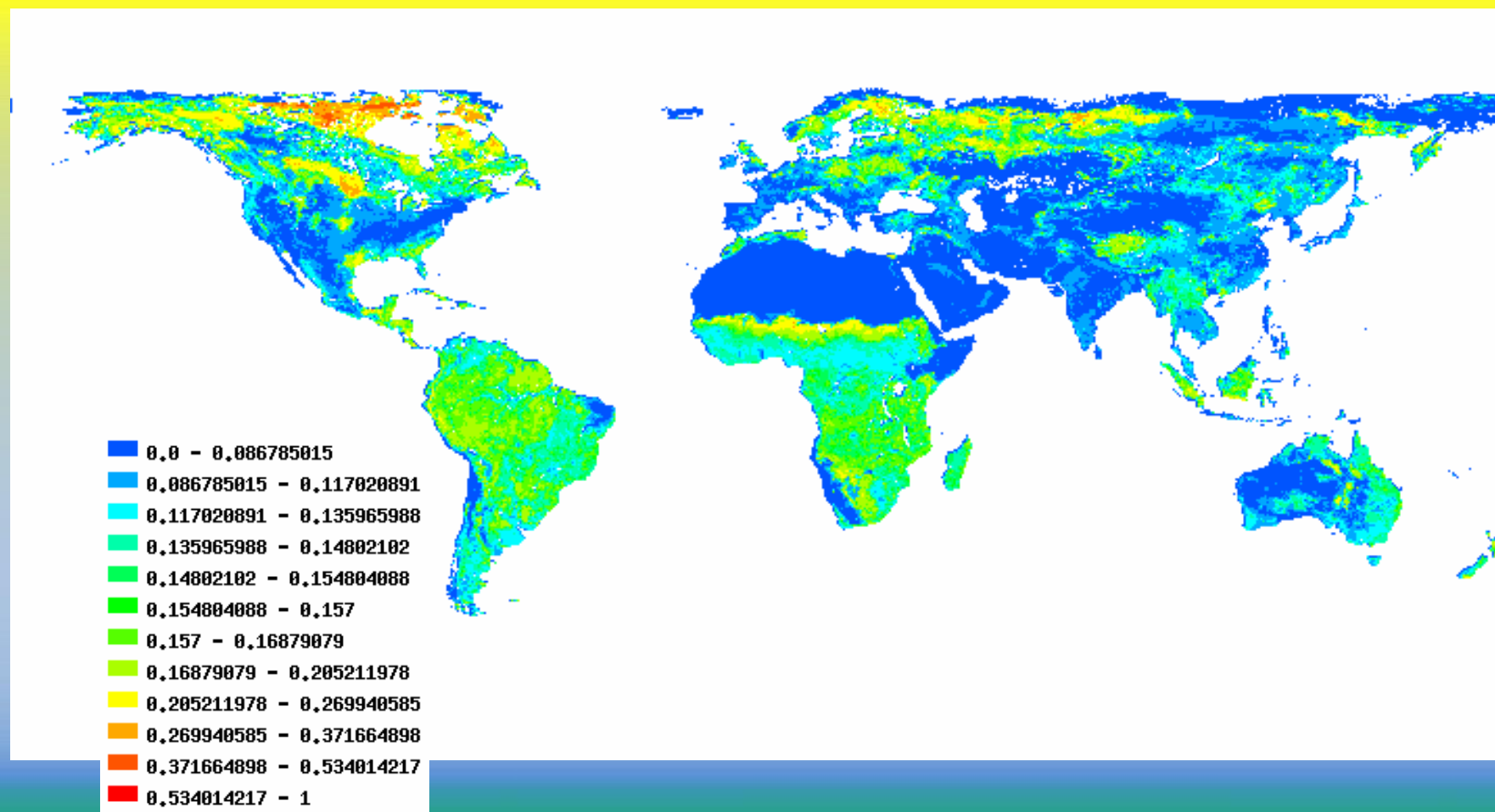




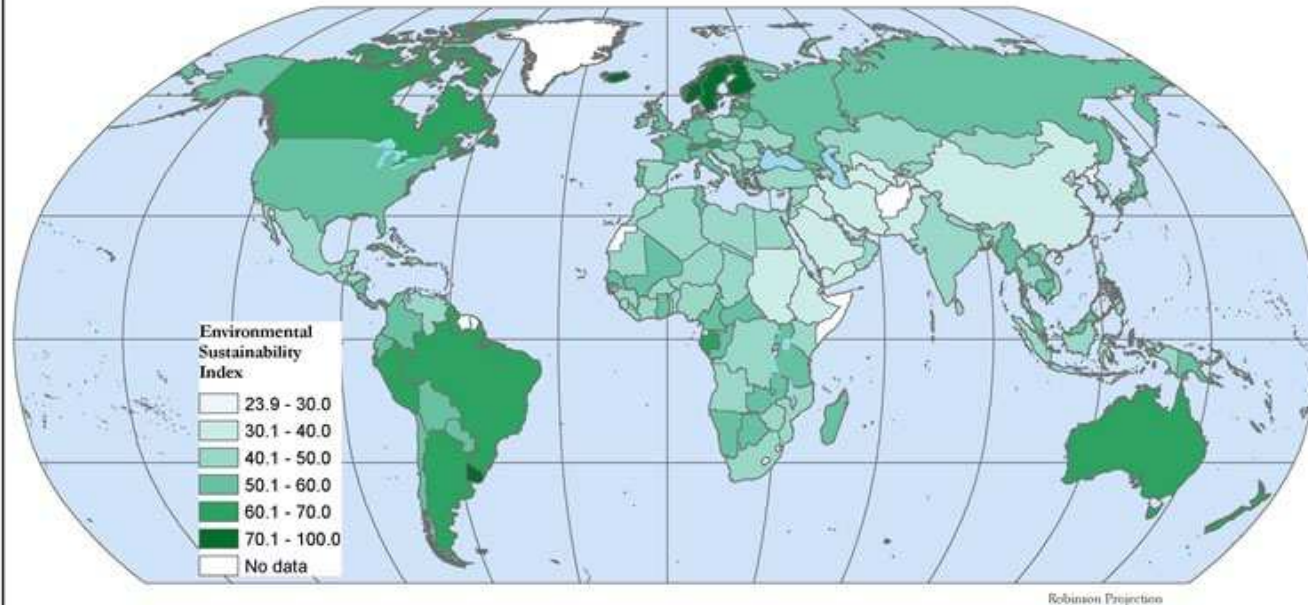
Monthly SST Climatology from 1971 to 2000 (Jan)



Albedo Visible Broadband (350-680 nm) Isometric BRDF Model Parameter
1995-02 (0.25 degree-resolution) (<http://webmap.ornl.gov>)



Environmental Sustainability Index 2005, by country



Index Description:

The Environmental Sustainability Index (ESI) is a unitless score ranging from theoretical minimum of 0 [bad] to a maximum of 100 [good].

The ESI score quantifies the likelihood that a country will be able to preserve valuable environmental resources effectively and avoid major environmental deterioration over the period of several decades.

Source:

Fors, Daniel C., Marc Levy, Tanja Srebotnjak, and Alexander de Sherbinn (2005). 2005 Environmental Sustainability Index: Benchmarking National Environmental Stewardship. New Haven: Yale Center for Environmental Law & Policy.

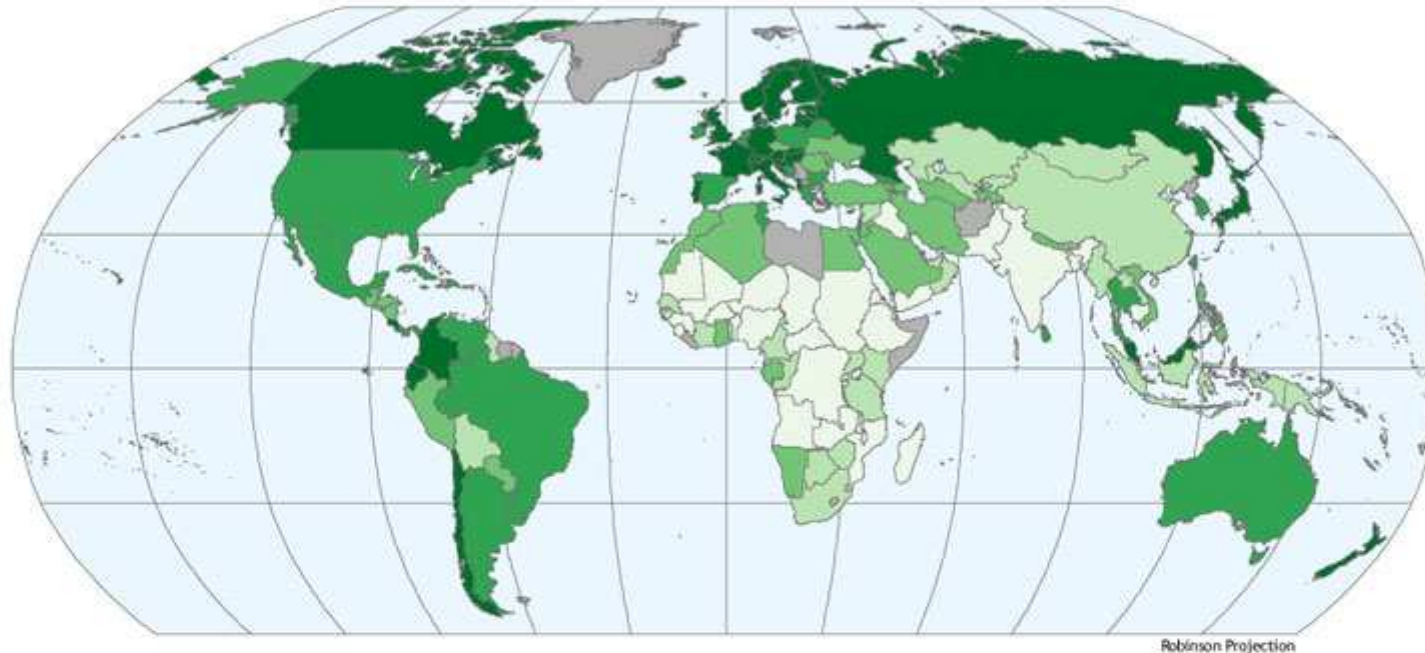


© 2008, The Trustees of Columbia University in the City of New York. Data available at: <http://sedac.ciesin.columbia.edu/es/compendium.html>



This document is licensed under a Creative Commons 3.0 Attribution License. <http://creativecommons.org/licenses/by/3.0/>

2008 Environmental Performance Index



Environmental Performance Index	
0.0 - 60.3	Lightest Green
60.4 - 70.3	Light Green
70.4 - 78.1	Medium Green
78.2 - 83.1	Dark Green
83.2 - 100.0	Darkest Green
no data	Grey

Index Description:

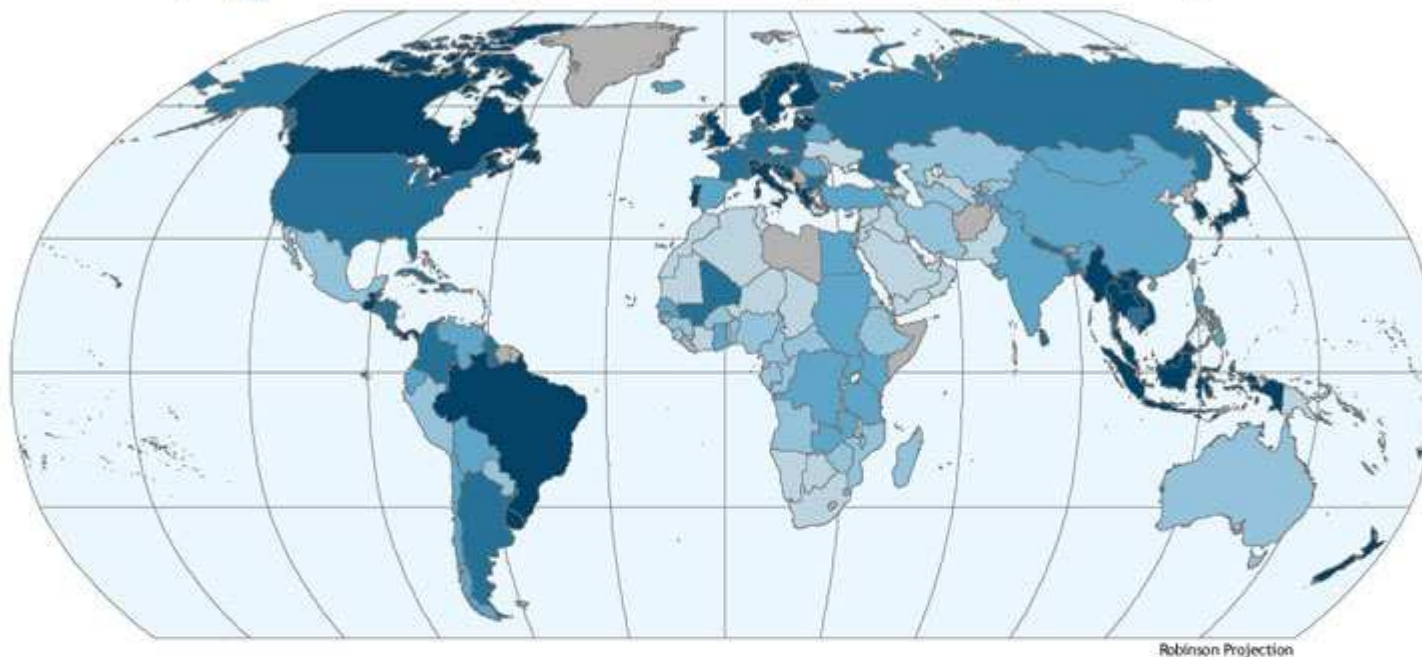
The Environmental Performance Index (EPI) is a unitless score based on a theoretical range from 0 to 100 (0 representing the farthest from target and 100 representing attainment of the target).

The EPI score quantifies a country's performance towards:
(1) reducing environmental stresses on human health, and
(2) promoting ecosystem vitality and sound natural resource management.

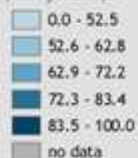
© 2008. The Trustees of Columbia University in the City of New York. Esty, Daniel C., M.A. Levy, C.H. Kim, A. de Sherbini, T. Srebotnjak, and V. Mara. 2008 Environmental Performance Index. New Haven: Yale Center for Environmental Law & Policy. Data available at: <http://sedac.ciesin.columbia.edu/es/epl/> and <http://epi.yale.edu>



Water (Effects on Ecosystems) Policy Category Scores (2008 EPI)



Water Policy Scores (ecosystems)



Index Description:

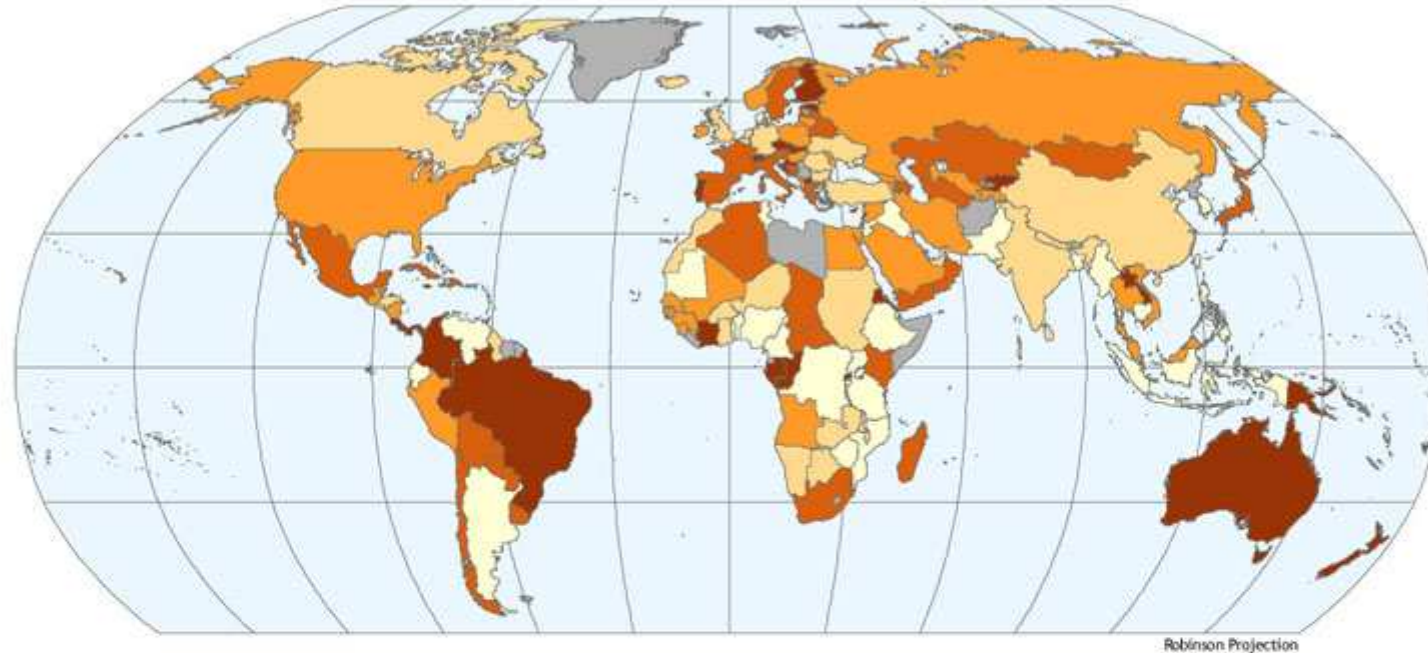
The Water (Effects on Ecosystems) Policy Category of the Ecosystem Vitality Objective from the 2008 EPI is a unitless score based on a theoretical range from 0 to 100 (0 represents the farthest from the target and 100 represents the attainment of the target). Scores are averaged across two constituent indicators: Water Quality and Water Stress. This policy category weight is 2.5% of the overall EPI.

© 2008. The Trustees of Columbia University in the City of New York. Esty, Daniel C., M.A., Levy, C.H. Kirk, A. de Sherbinin, T. Srebotnjak, and V. Mara. 2008 Environmental Performance Index. New Haven: Yale Center for Environmental Law & Policy. Data available at: <http://sedac.ciesin.columbia.edu/es/eipi/> and <http://eipi.yale.edu>



This document is licensed under a Creative Commons 3.0 Attribution License. <http://creativecommons.org/licenses/by/3.0/>

Productive Natural Resources Policy Category Scores (2008 EPI)



Productive Natural Resources Scores

0.0 - 72.8
72.9 - 78.6
78.7 - 83.8
83.9 - 88.6
88.7 - 100.0
no data

Index Description:

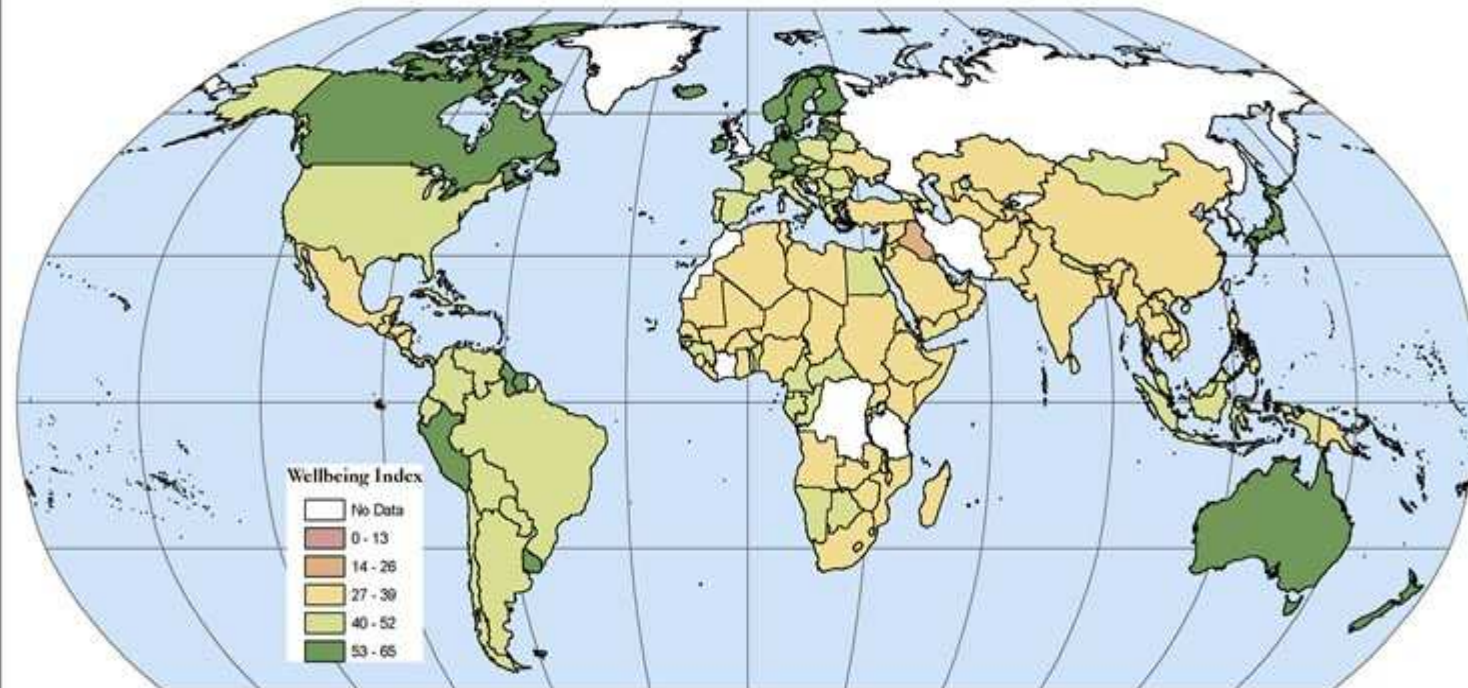
The Productive Natural Resource Policy Category of the Ecosystem Vitality Objective from the 2008 EPI is a unitless score based on the theoretical range from 0 to 100 (0 represents farthest from the target and 100 represents attainment of the target). Scores are averaged across the three constituent sub-categories: Forestry, Fishery and Agriculture. Countries with no forests, no active marine fishing fleets and industries, and no land used in agriculture may be missing certain indicators, associated with those activities. This category weight is 7.5% of the overall EPI.

© 2008. The Trustees of Columbia University in the City of New York. Esty, Daniel C., M.A. Levy, C.H. Kim, A. de Shorbinin, T. Srebotnjak, and V. Mara. 2008 Environmental Performance Index. New Haven: Yale Center for Environmental Law & Policy. Data available at: <http://sedac.ciesin.columbia.edu/es/epl/> and <http://epi.yale.edu>



This document is licensed under a
Creative Commons 3.0 Attribution License
<http://creativecommons.org/licenses/by/3.0/>

The Wellbeing of Nations - The Wellbeing Index 2001



Projection: Robinson

Index Description:

The Wellbeing Index (WI) is the average of the Human Wellbeing Index and the Ecosystem Wellbeing Index. It is a unitless score where 0 is the worst possible score and 100 is the best.

The WI reflects a community's readiness to achieve sustainability, measuring a combination that allows the least environmental costs in exchange for a high quality of human life. The data identifies three integral components that contribute to a high WI score: freedom, sound governance and education.

Source:

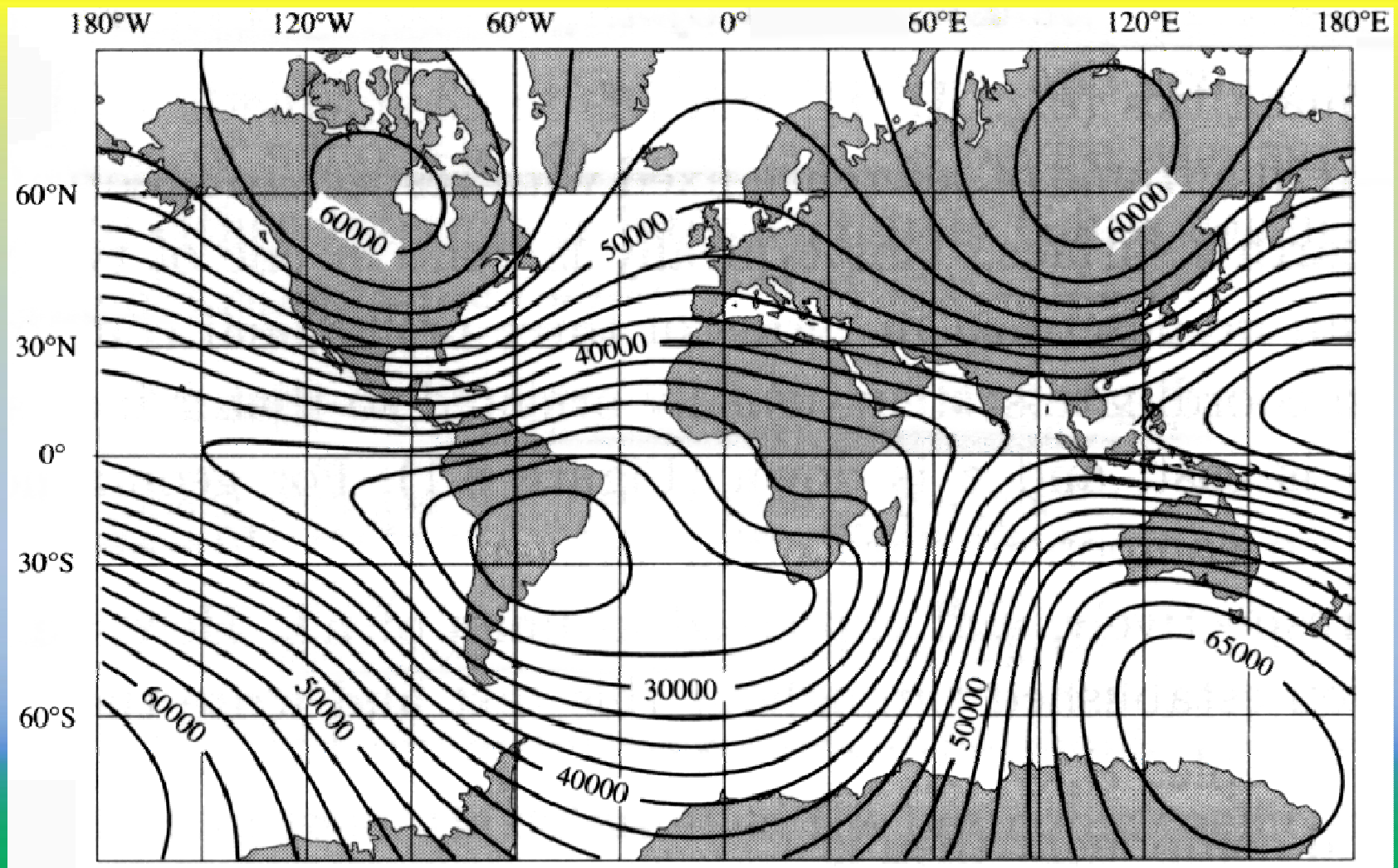
Prescott-Allen, Robert (2001). *The Wellbeing of Nations: A Country-by-Country Index of Quality of Life and the Environment*. Washington, DC: Island Press.



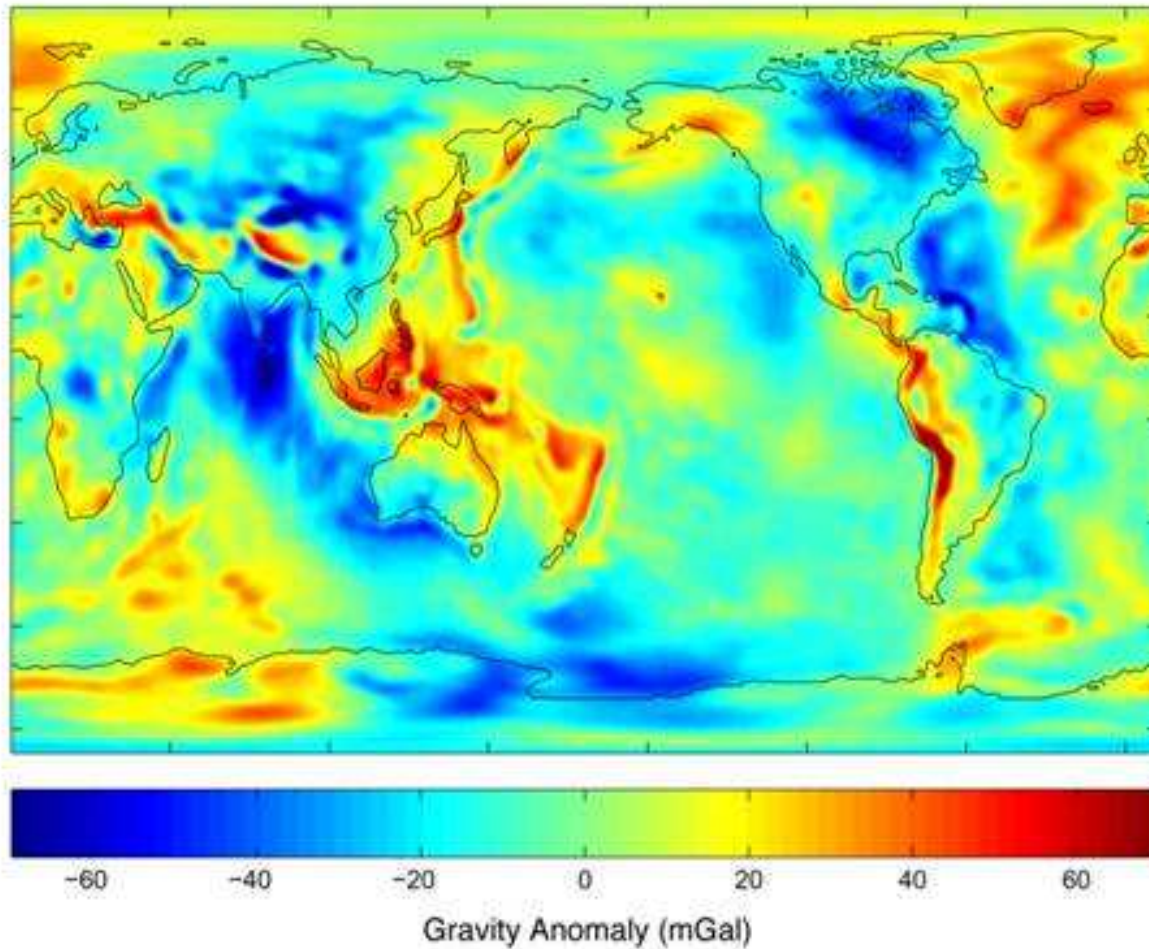
Copyright 2007, The Trustees of Columbia University in the City of New York. Data available at: <http://sedac.ciesin.columbia.edu/es/compendium.html>

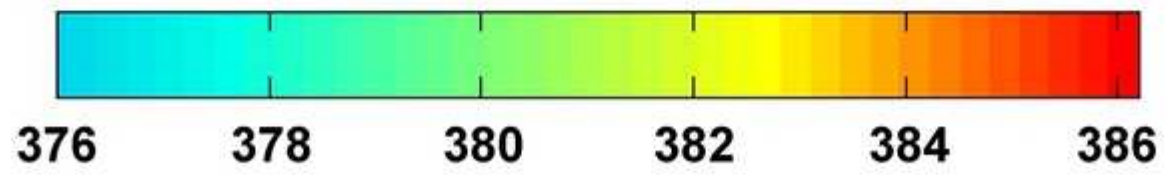
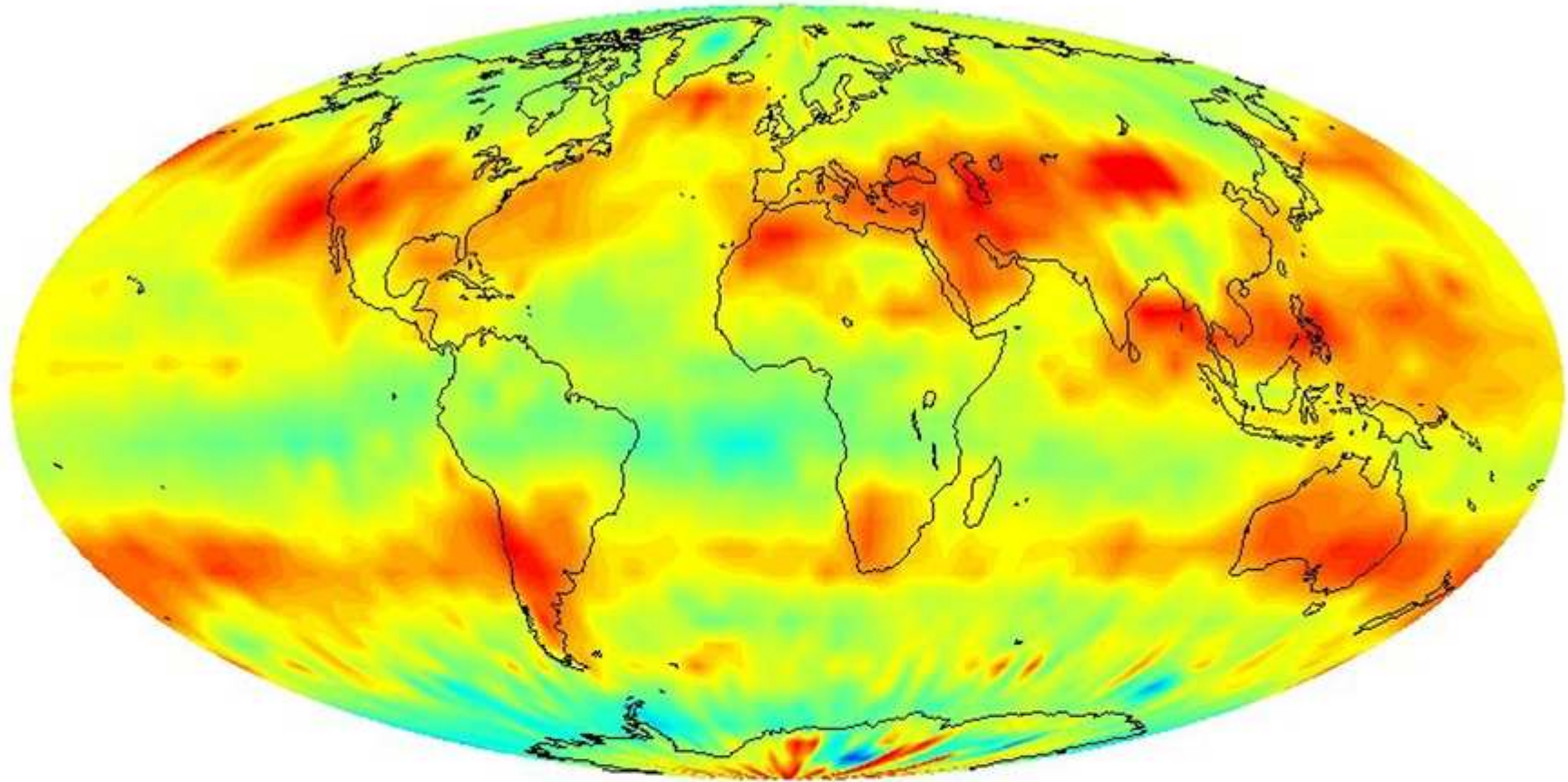
Total magnetic field presented in nanoTeslas

http://geophysics.ou.edu/solid_earth/notes/mag_earth/magnetic_field_a.gif



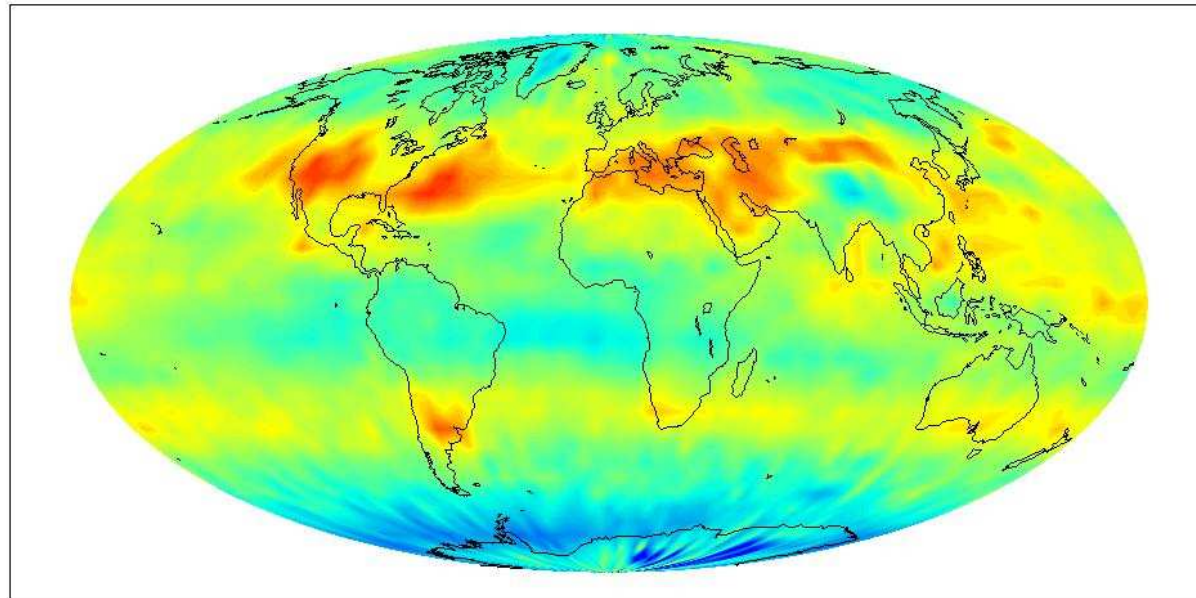
GRACE Gravity Model 01 based on 111 days of GRACE data
(NASA, 2003)





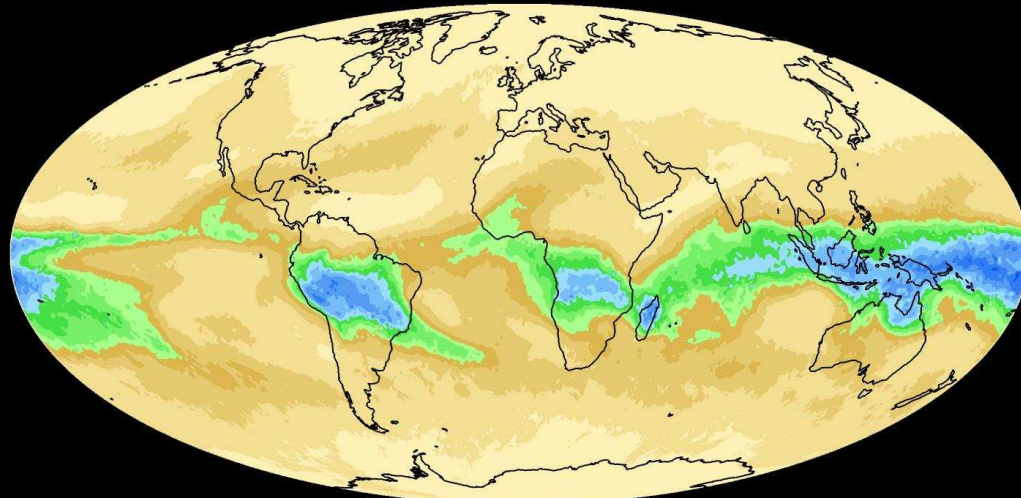
AIRS July 2008 CO₂ (ppmv)

NASA AIRS Mid-Tropospheric (8km) Carbon Dioxide
July 2003

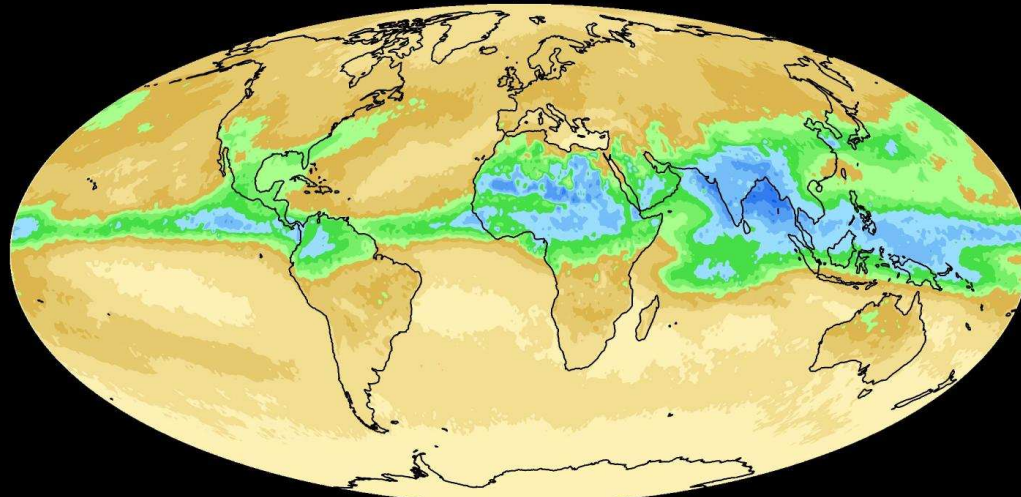


Concentration in parts-per-million by volume

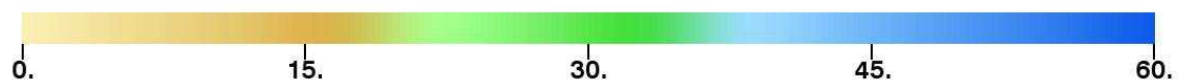
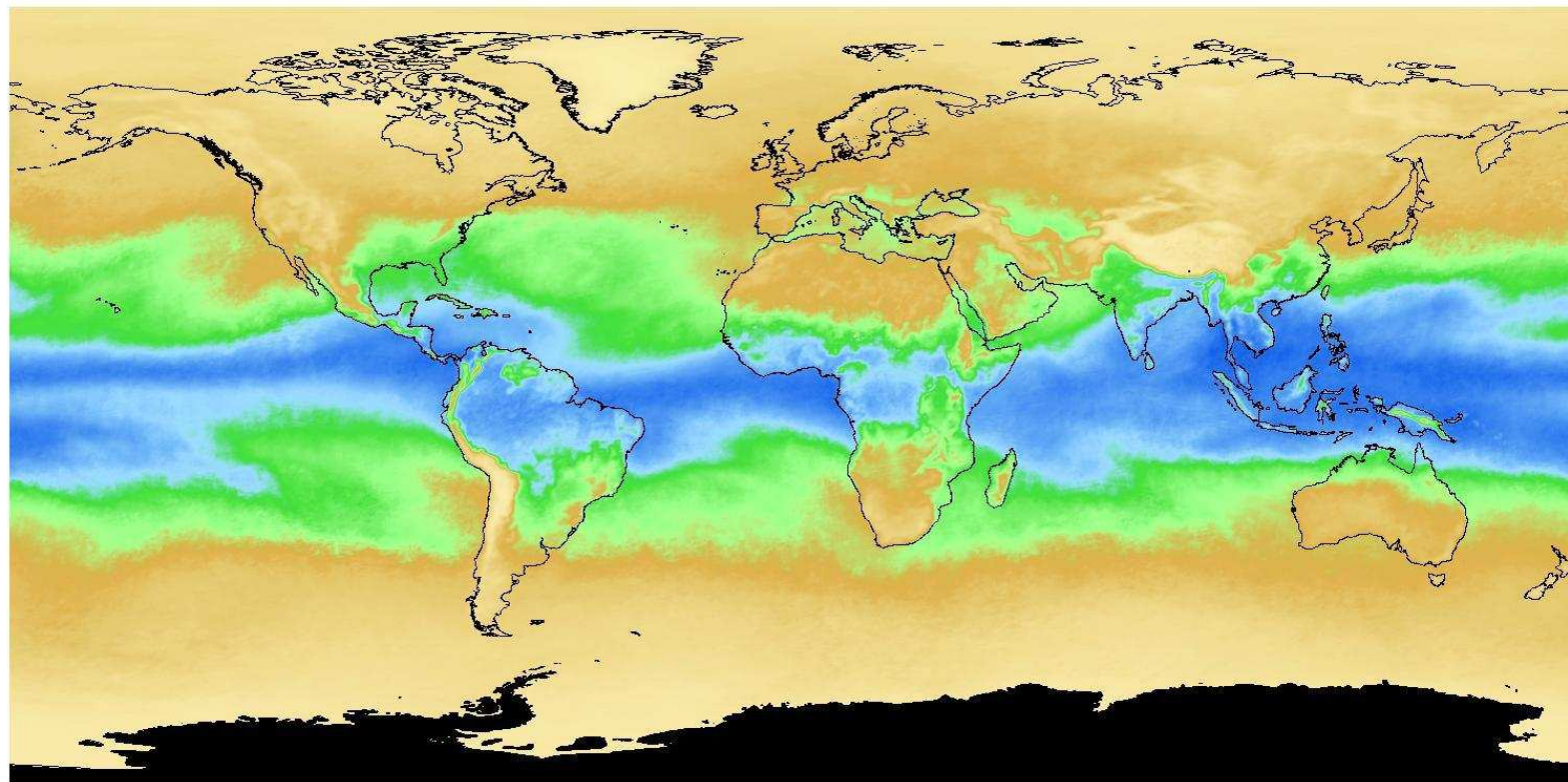
Mean Clear Air Precipitable Water
500mb to TOA
AIRS data, January 2003



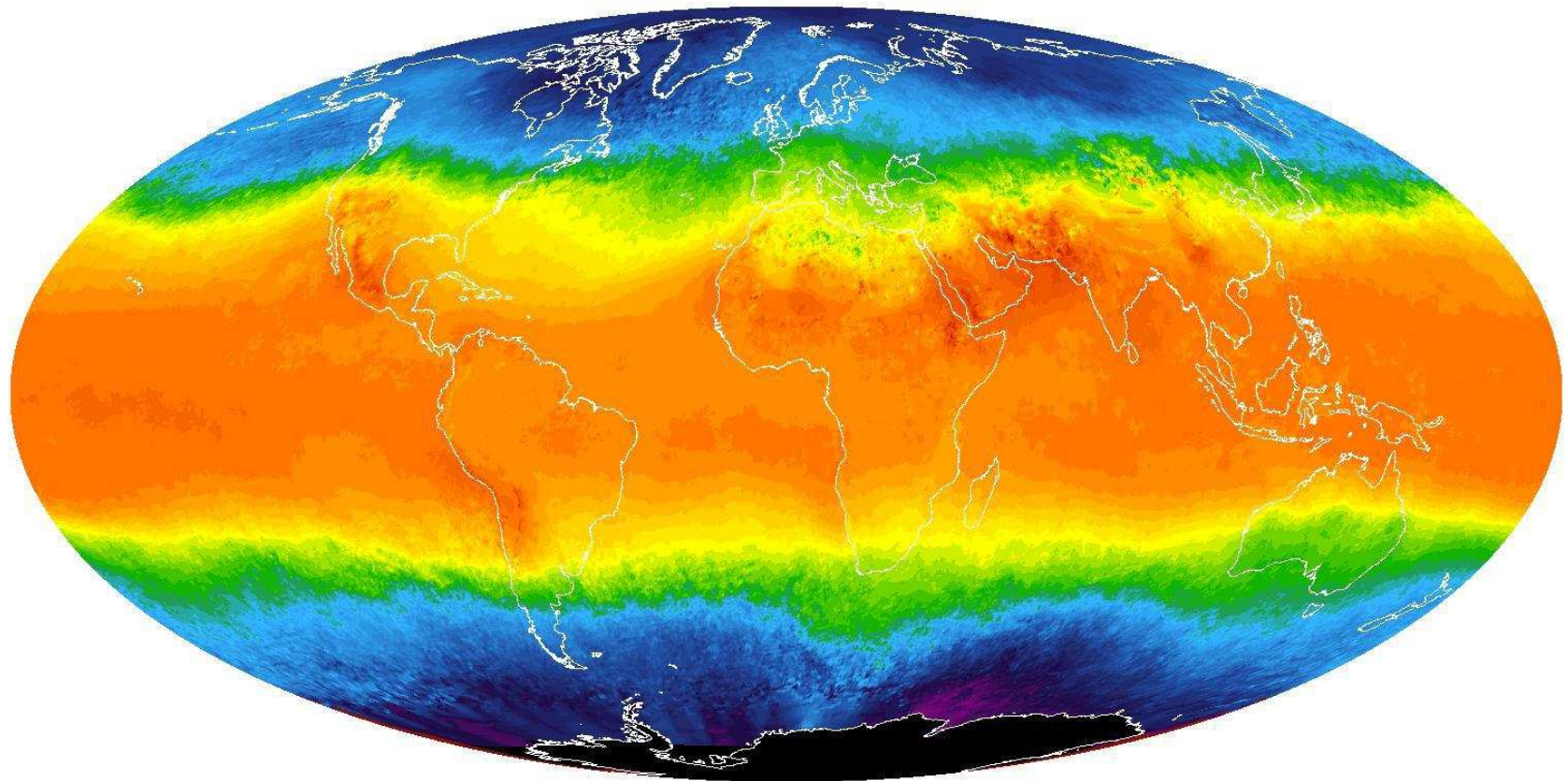
Mean Clear Air Precipitable Water
500mb to TOA
AIRS data, July 2003



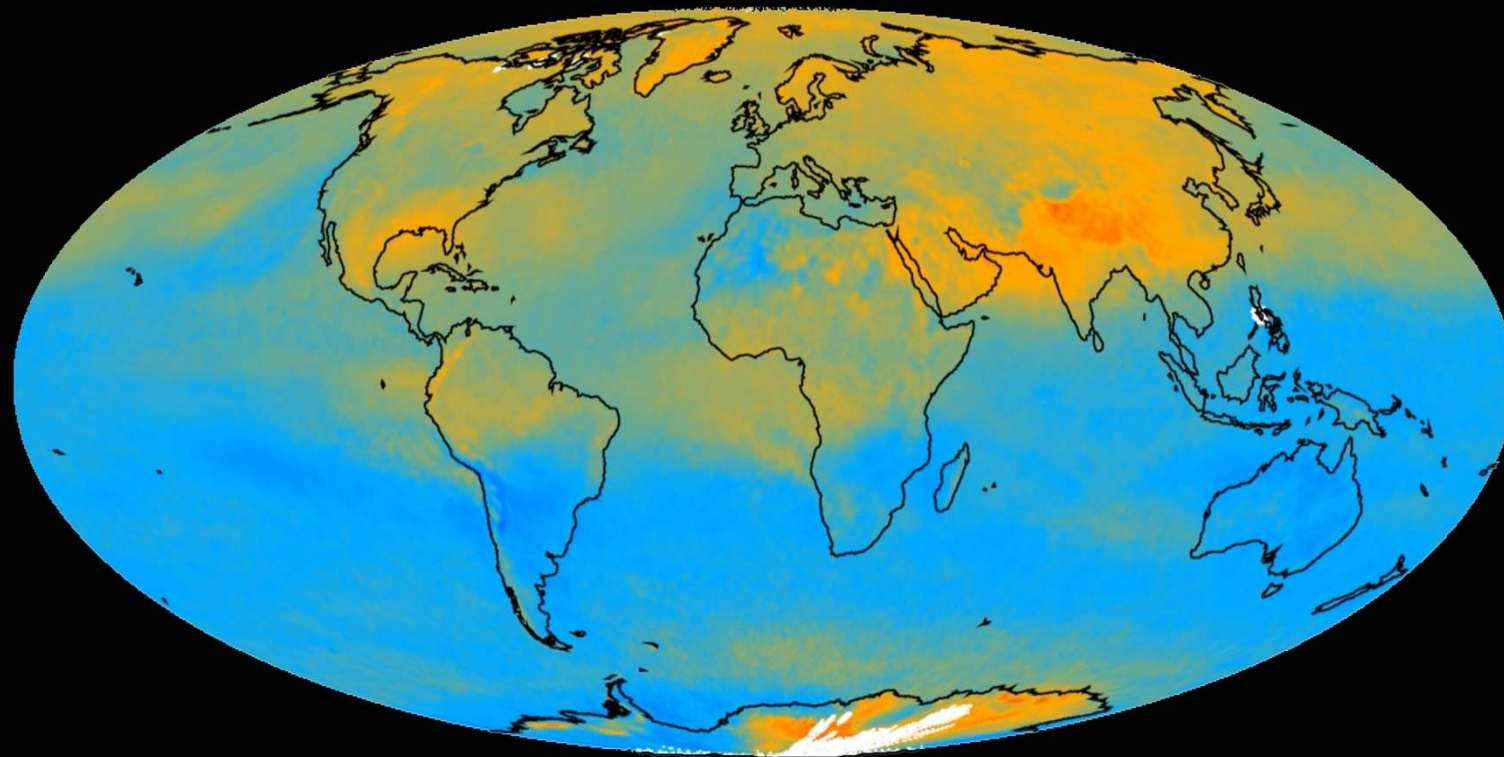
AIRS TOTAL PRECIPITABLE WATER VAPOR (mm), May 2009



AIRS DAYTIME AIR TEMPERATURE AT 700mb (F), May 2009



AIRS-Retrieved Global Tropospheric Methane for August 2005



parts per billion by volume, ppbv



1687

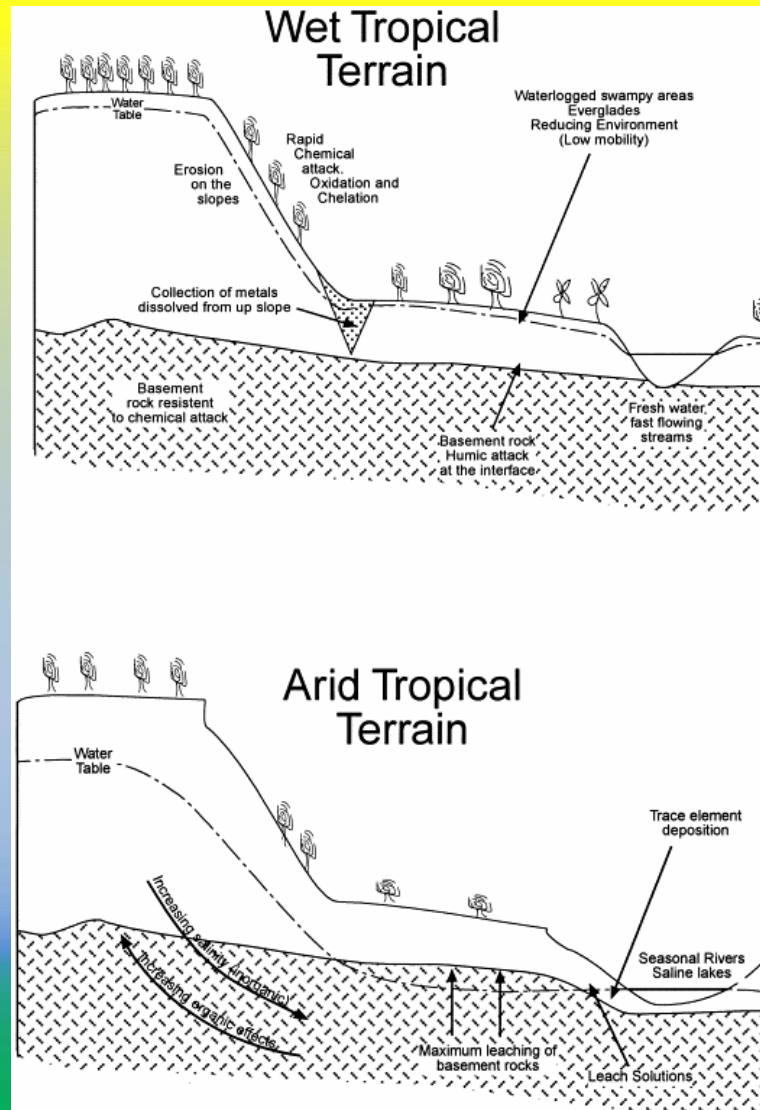
1723

1760

1797

1833

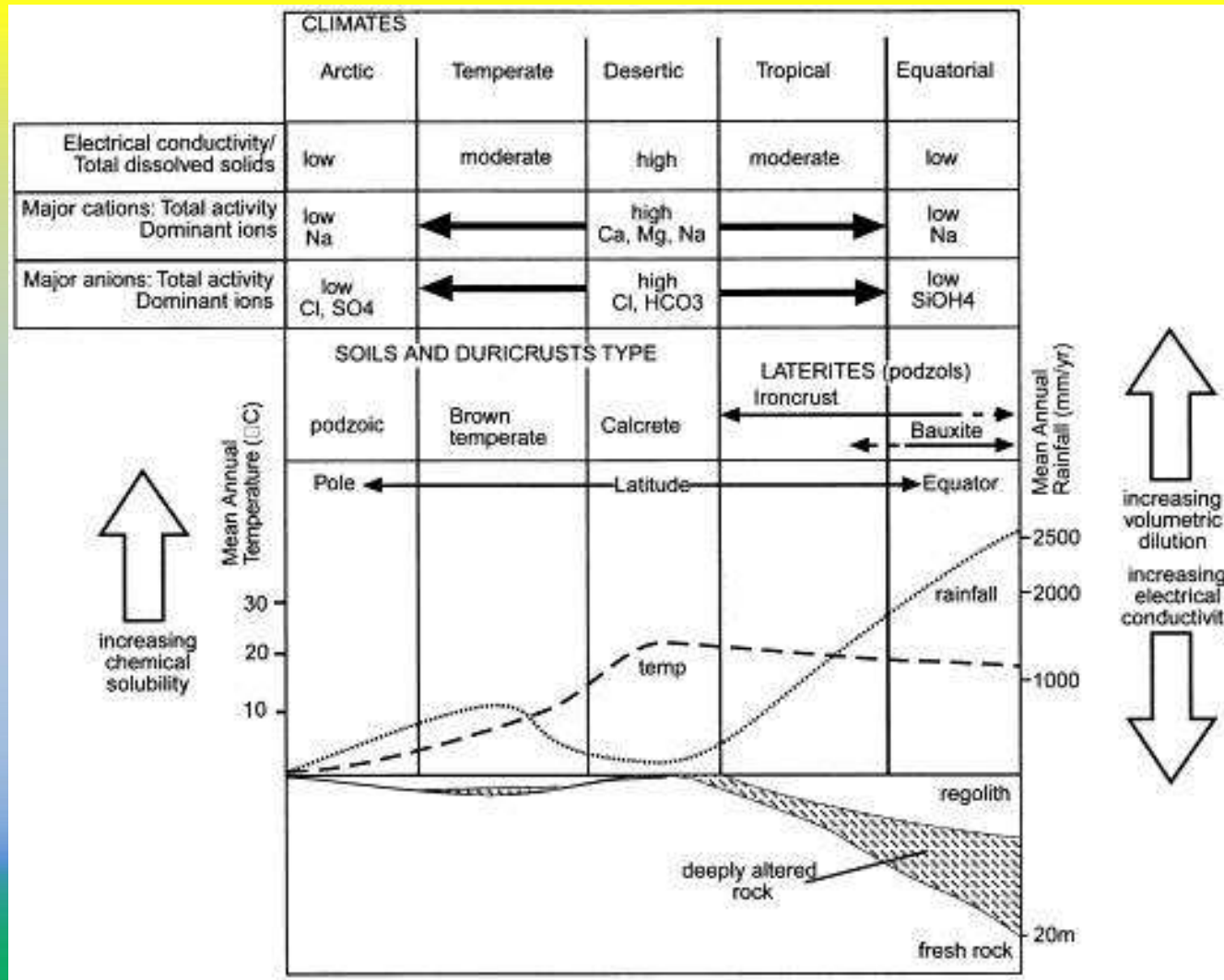
Comparison of typical relationships between wet and arid tropical environments (Plant et al, 2001)



The relative mobility of some essential and potentially toxic elements in different surface conditions (Plant et al, 2001)

Relative Mobilities	Environmental Conditions		Environmental Conditions	
	Oxidising	Top Profile	Acid	Humid
Very High	I		I	
High	Mo U Se F Ra Zn		Mo U Se F Ra Zn Cu Co Ni Hg	
Medium	Cu Co Ni Hg As Cd		As Cd	
Low	Pb Be Bi Sb Ti		Pb Be Bi Sb Ti Fe Mn	
Very Low	Fe Mn Al Cr	Al Cr		
Very Low	Al Cr Mo U Se Zn Co Cu Ni Hg	Al Cr Zn Cu Co Ni Hg	Arid	
Low	As Cd Pb Be Bi Sb Ti	Pb Be Bi Sb Ti Fe Mn		
Medium	Fe Mn	As Cd		
High	F Ra	F Ra		
Very High	I	I Mo U Se		
Relative Mobilities	Reducing	Base Profile	Alkaline	

Generalised relationship between regolith, thickness of the weathering zone, climatic factors and water chemistry (Plant et al 2001)



Crenologia Brasil

- .Disciplin in 2 Brazilian Universities untill 1950
- .Comissão Crenológica Nacional Dr. Mário Mourão
- .Código das Águas, 1945
- .Pharmacopoeias (include Brazil and USA)
- .Water and Natural Therapeutics Resources Laws

Salt, Sand, Mud, Algae/Plankton,...



Tópicos

- Environment
- BAC (Biologically Active Compounds)
- Natural Products
- Knowledge – Clinical Trials
- Courses
- Science and Academic interest
- Divulgation

Medicina Natural

www.naturopathic.org

- Naturopathy
- Alternative
- Complementary (SUS)
- Phytotherapy
- Homeopathy
- Acunpuncture
- Hydrotherapy
- Wellness and Welfare
- Antroposofhy
- Nutrition
- PBPk – ADMNET Nature
- Cosmtics