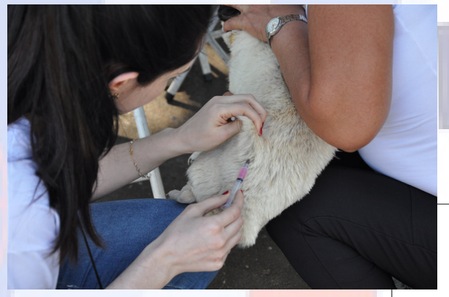
Spatial Epidemiology Course: Introduction and basic concepts

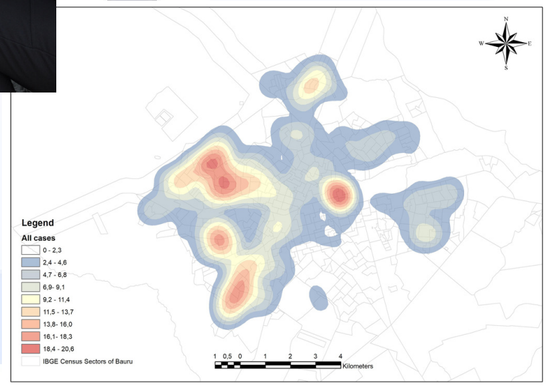
Professor Cassiano Victória
UQ Visiting Professor
Professor of Preventive Veterinary Medicine and One Health
School of Veterinary Medicine and Animal Science
São Paulo State University - UNESP
Brazil

A little bit 'bout me...

- Graduated in Veterinary Medicine at the University of Marilia (1998)
- Master Degree in Veterinary Medicine at the Sao Paulo State University - UNESP Botucatu (2003)
- Doctor Degree in Preventive Veterinary Medicine (2007)
- Veterinary Doctor Coordinator of the Environmental Health Surveillance Team VAS of Botucatu - SP (2005 - 2009)
- Experience in Preventive Veterinary Medicine and Public Health, with emphasis in monitoring in health, specially Public health, Zoonosis, Epidemiologic Survey, Geoprocessing and Geoestatistics, OneHealth and rabies control.
- Currently Professor Doctor of the Department of Animal Production and Preventive Veterinary Medicine of the FMVZ - Botucatu SP and visitor professor at The University of Queensland (UQ) - Austrália.

fmvz - unesp
Faculdade de Medicina Veterinária e Zootecnia
Campus de Botucatu





Learning goals

- **Remember the basics concepts**
- **Geoprocessing and GIS**
- **Datum and Coordinates systems**
- **Databases**
- **Best practices**

Basic concepts

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1			Funcionário:												CPF
2															
3	Data	Tipo		Jornada		Jornada	Jornada	Em	Total	Sem	Total	Espera			
4				Início	Fim	Normal	Diária	Direção	Parado	Direção	Refeição	Diurna	Noturna	Total	Dif
5	16/08/22 ter	Trabalho		03:56	13:32	08:00	08:10	05:36	02:56	02:34	01:13	00:22		00:22	0
6	17/08/22 qua	Trabalho		06:07	17:01	08:00	09:53	04:41	05:12	05:12	01:01				0
7	18/08/22 qui	Folga													
8	19/08/22 sex	Folga													
9	20/08/22 sáb	Trabalho		04:04	17:44	04:00	12:30	09:51	02:57	02:39	01:00	00:18		00:18	0
10	21/08/22 dom	Trabalho		05:13	15:59	08:00	09:22	06:59	02:39	02:23	01:08	00:16		00:16	0
11	TT H S Semana						39:55	27:07	13:44	12:48	04:22	00:56		00:56	1
12	22/08/22 seg	Trabalho		03:52	15:58	08:00	10:59	08:42	02:36	02:16	00:57	00:20		00:20	0
13	23/08/22 ter	Trabalho		04:15	16:03	08:00	10:31	07:33	03:22	02:58	00:59	00:24		00:24	0
14	24/08/22 qua	Trabalho		04:06	15:52	08:00	10:42	03:57	06:52	06:44	01:04	00:08		00:08	0
15	25/08/22 qui	Folga													
16	26/08/22 sex	Trabalho		04:11	15:55	08:00	10:39	08:10	02:43	02:29	00:58	00:14		00:14	0
17	27/08/22 sáb	Trabalho		04:08	15:55	04:00	10:48	08:13	02:41	02:35	01:00	00:06		00:06	0
18	TT H S Semana						53:39	36:35	16:14	17:02	04:58	01:12		01:12	1
19	TT H S Período						93:34	63:42	31:58	29:50	09:20	02:08		02:08	2
20															
21			Funcionário:												CPF
22															
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24				Início	Fim	Normal	Diária	Direção	Parado	Direção	Refeição	Diurna	Noturna	Total	Dif
25	16/08/22 ter	Trabalho		03:56	13:32	08:00	08:10	05:36	02:56	02:34	01:13	00:22		00:22	0
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27	18/08/22 qui	Folga													
28	19/08/22 sex	Folga													
29	20/08/22 sáb	Trabalho		04:04	17:44	04:00	12:30	09:51	02:57	02:39	01:00	00:18		00:18	0
30	21/08/22 dom	Trabalho		05:13	15:59	08:00	09:22	06:59	02:39	02:23	01:08	00:16		00:16	0
31	TT H S Semana						39:55	27:07	13:44	12:48	04:22	00:56		00:56	1
32	22/08/22 seg	Trabalho		03:52	15:58	08:00	10:59	08:42	02:36	02:16	00:57	00:20		00:20	0
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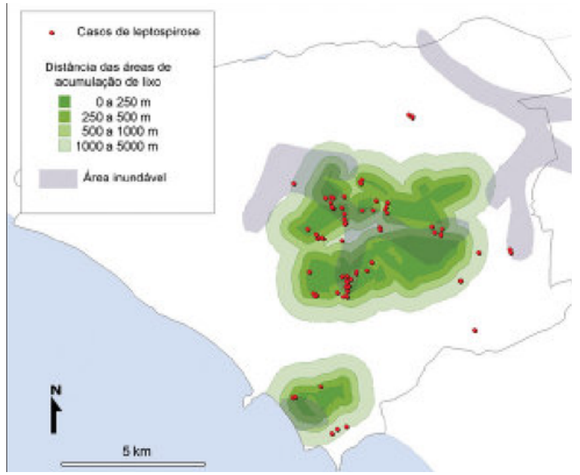
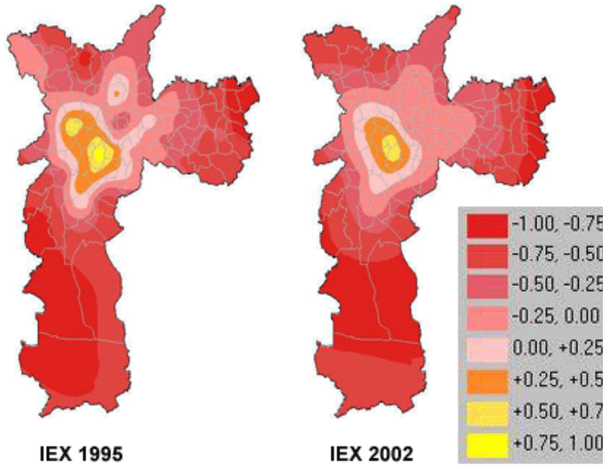


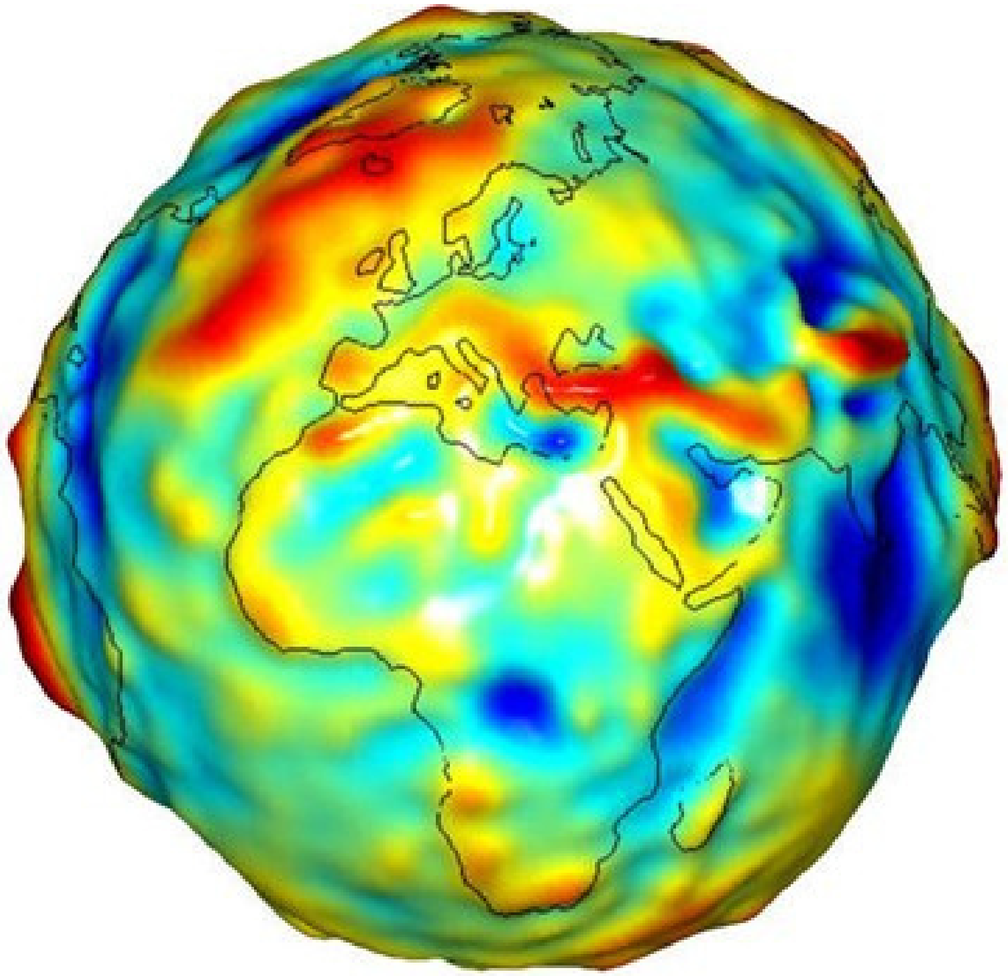


IEX 1995

IEX 2002

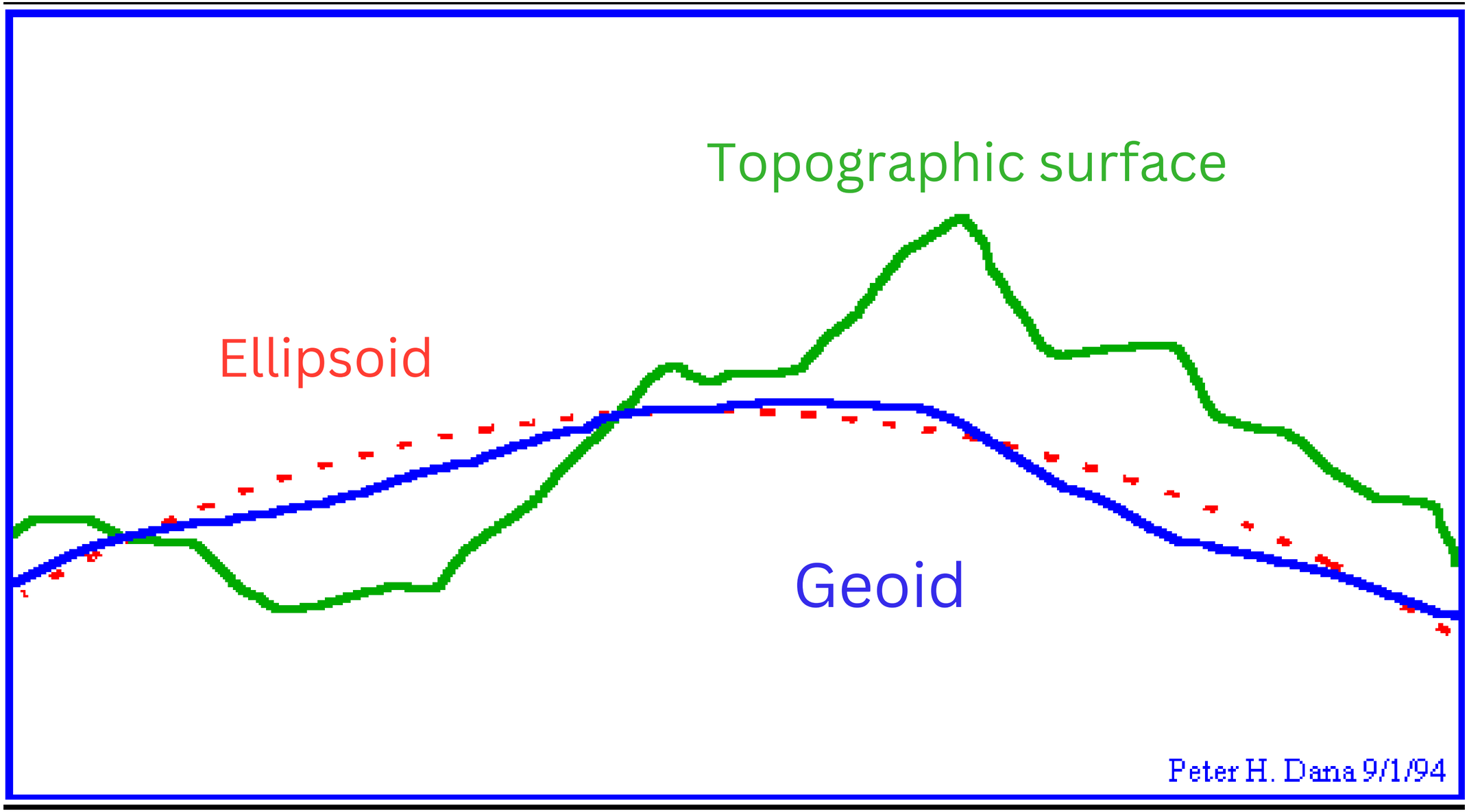
Basic concepts: geoid

Geoid



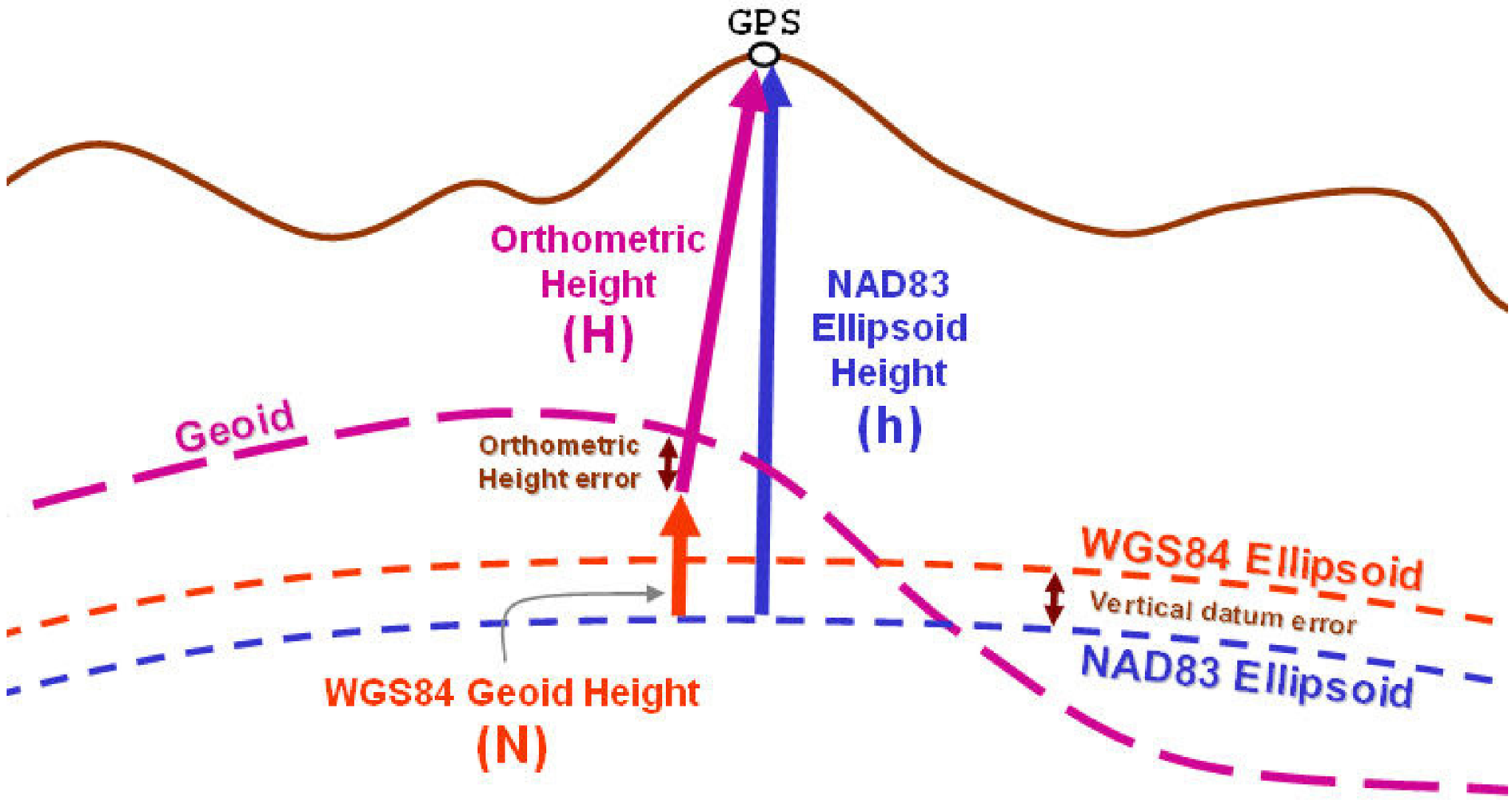
http://www.geoeduc.com/termina-hoje-o-prazo-para-transicao-ao-sirgas2000-entenda/

Basic concepts: ellipsoid

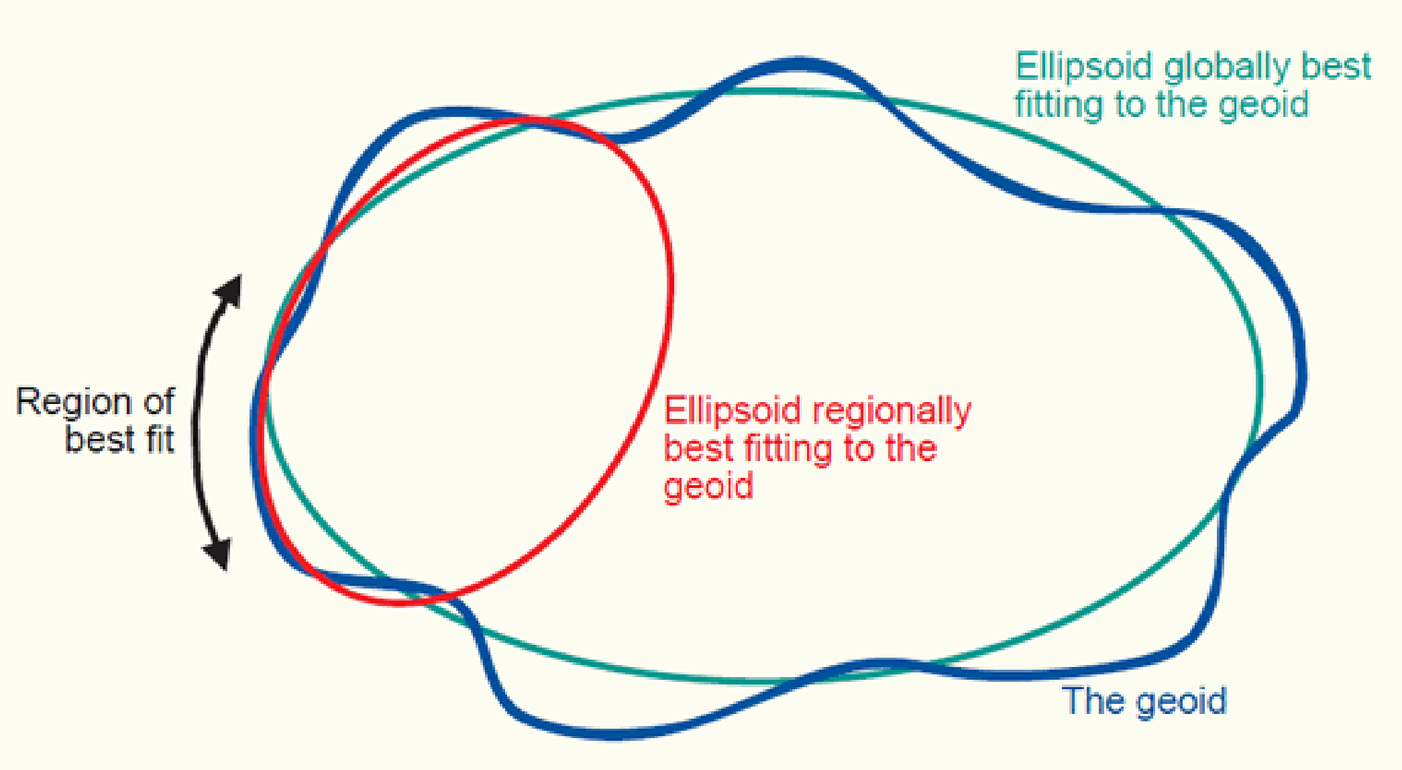


Basic concepts: ellipsoid

Planimetric Datum → reference elipsoid



Basic concepts: ellipsoid



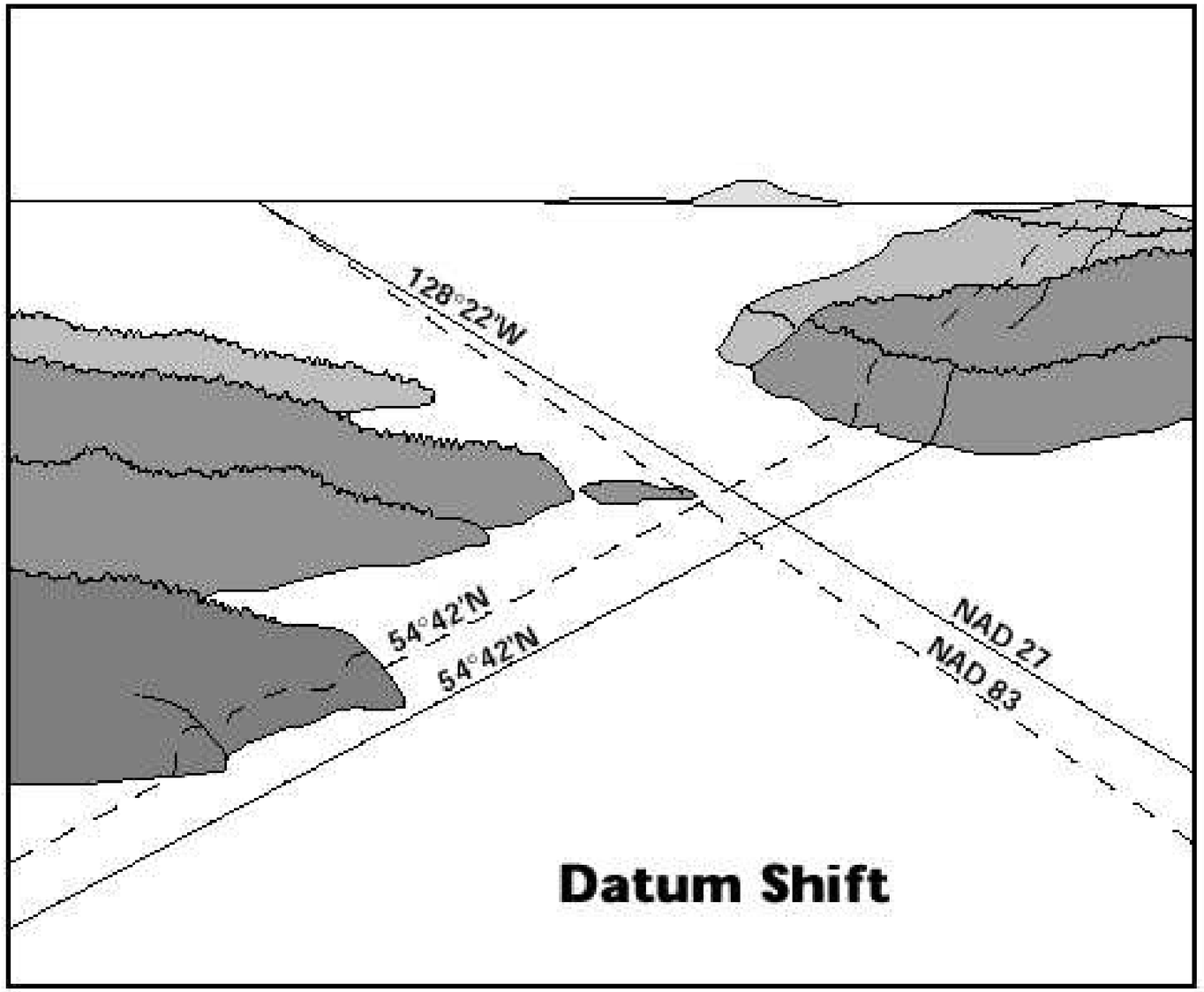
Brazil

Until 1978 - Córrego-alegre	Major axis ->6.378.388 m	} 228 m
1979 - SAD-69	Major axis ->6.378.160 m	
WGS-84 - satélites GPS	Major axis ->6.378.137 m	} 23 m

Em 2015 – dia 25 de fevereiro

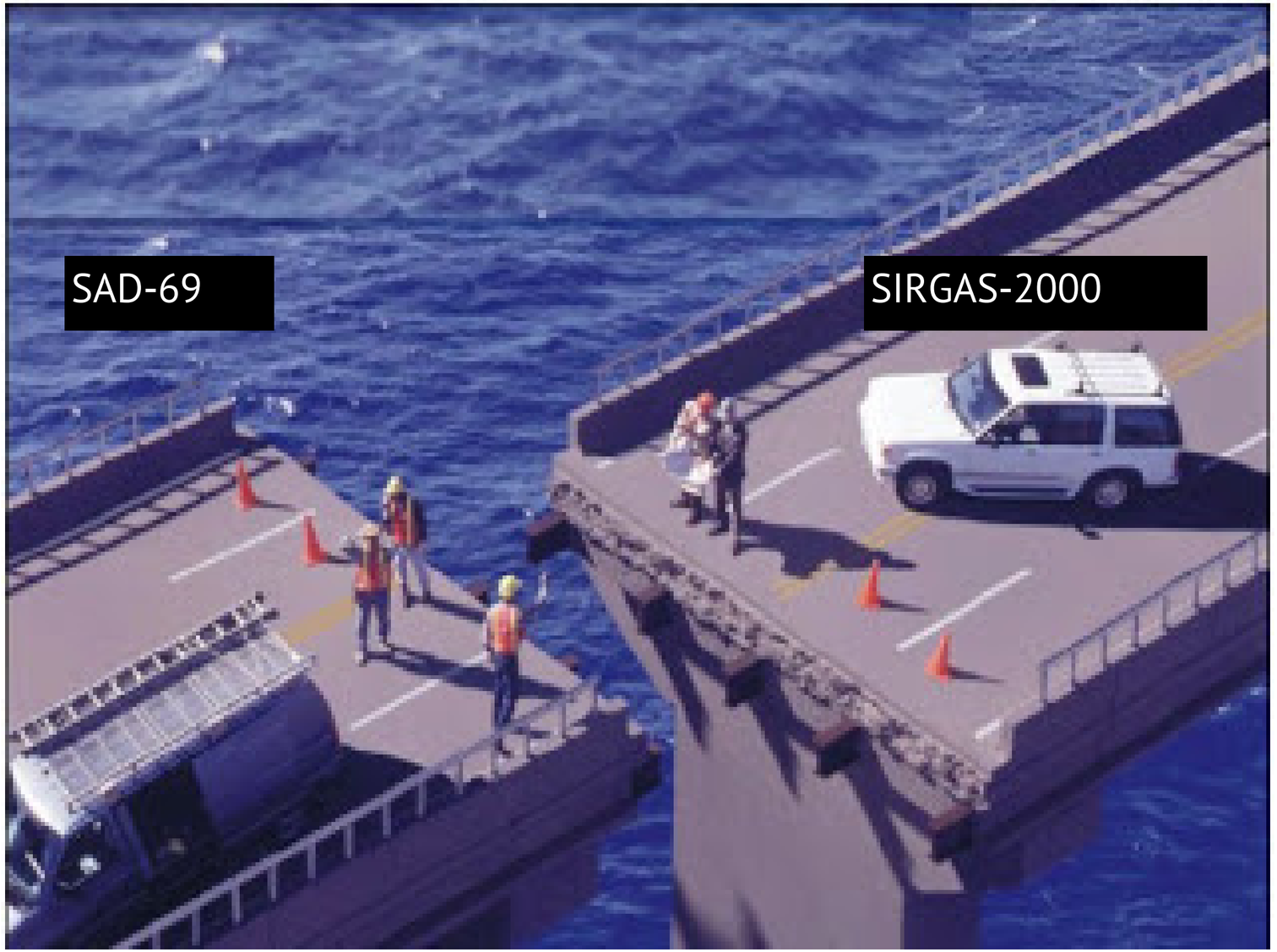
SIRGAS 2000	Major axis ->6.378.137 m

Basic concepts: ellipsoid



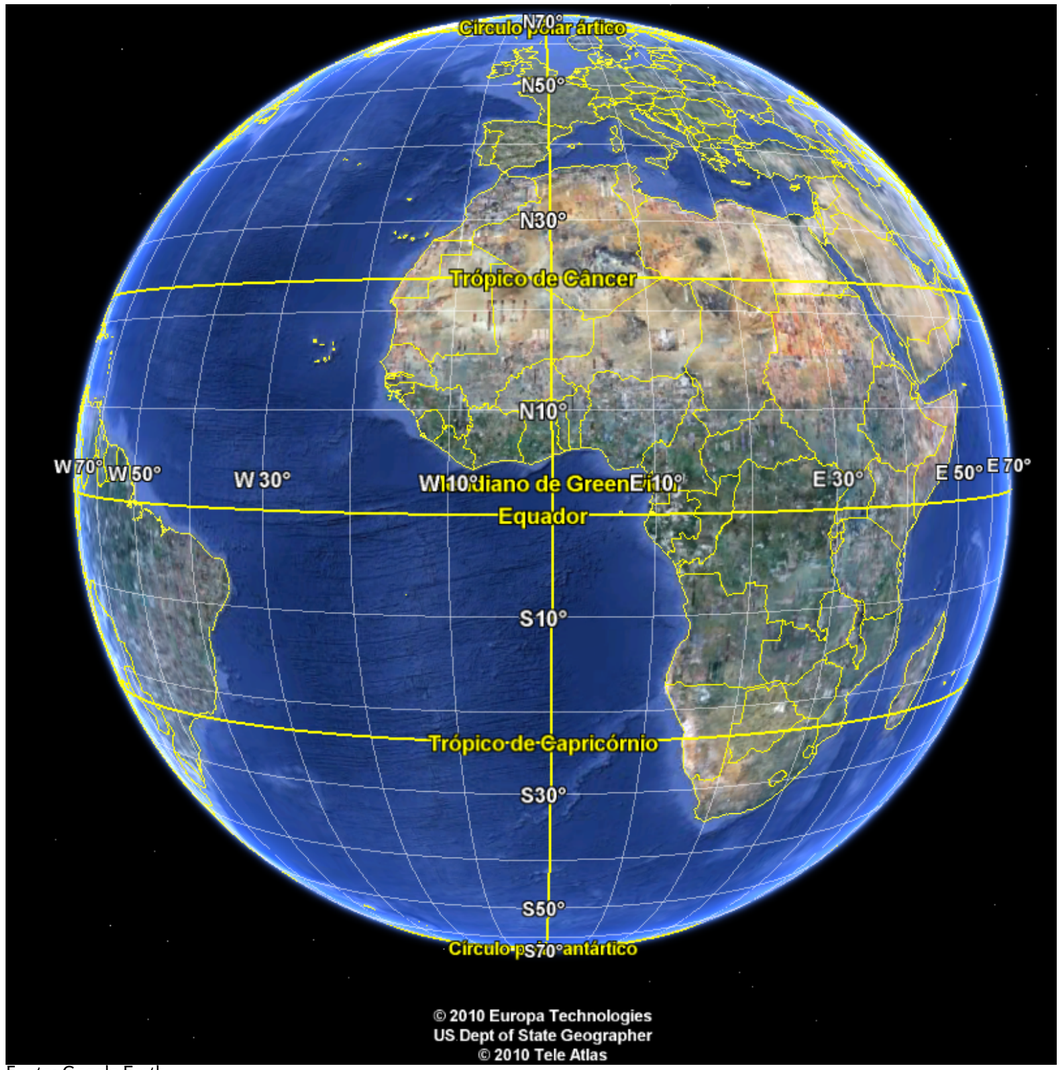
Fonte: http://www.shipwrite.bc.ca/aboutgps.htm

Basic concepts: ellipsoid

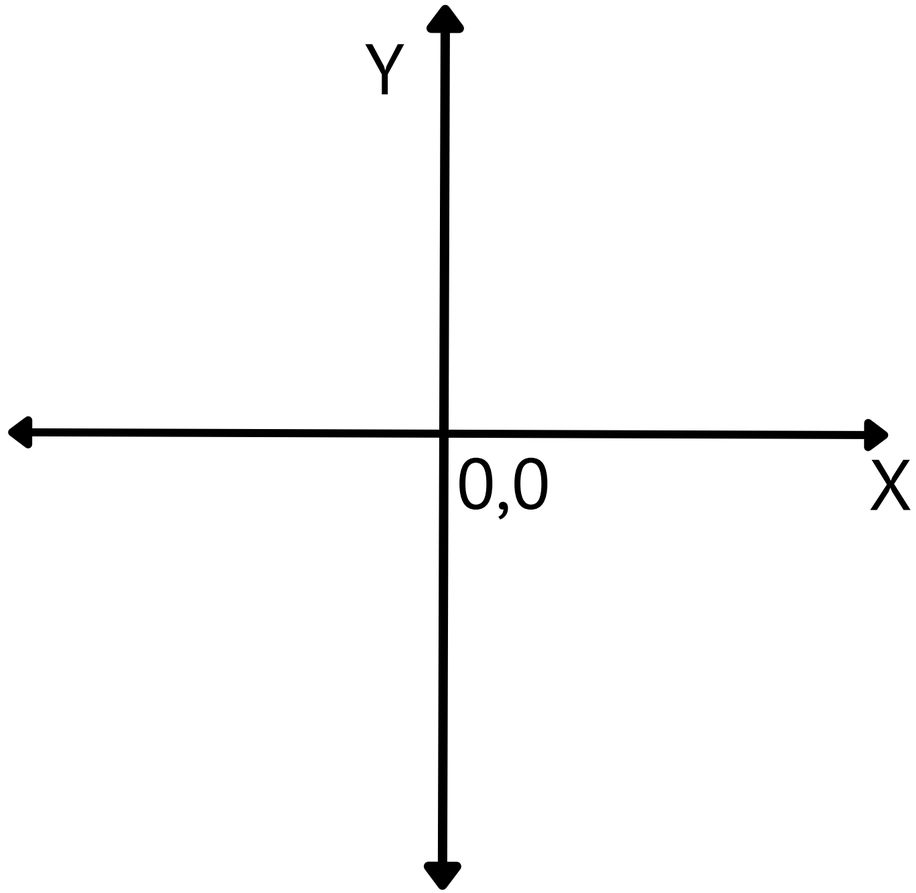


Fonte:http://geoxy.blogspot.com.br/2009/01/projeo-datum-e-sig-mas-que-diabos.html

Basic concepts: Coordinates Sistems

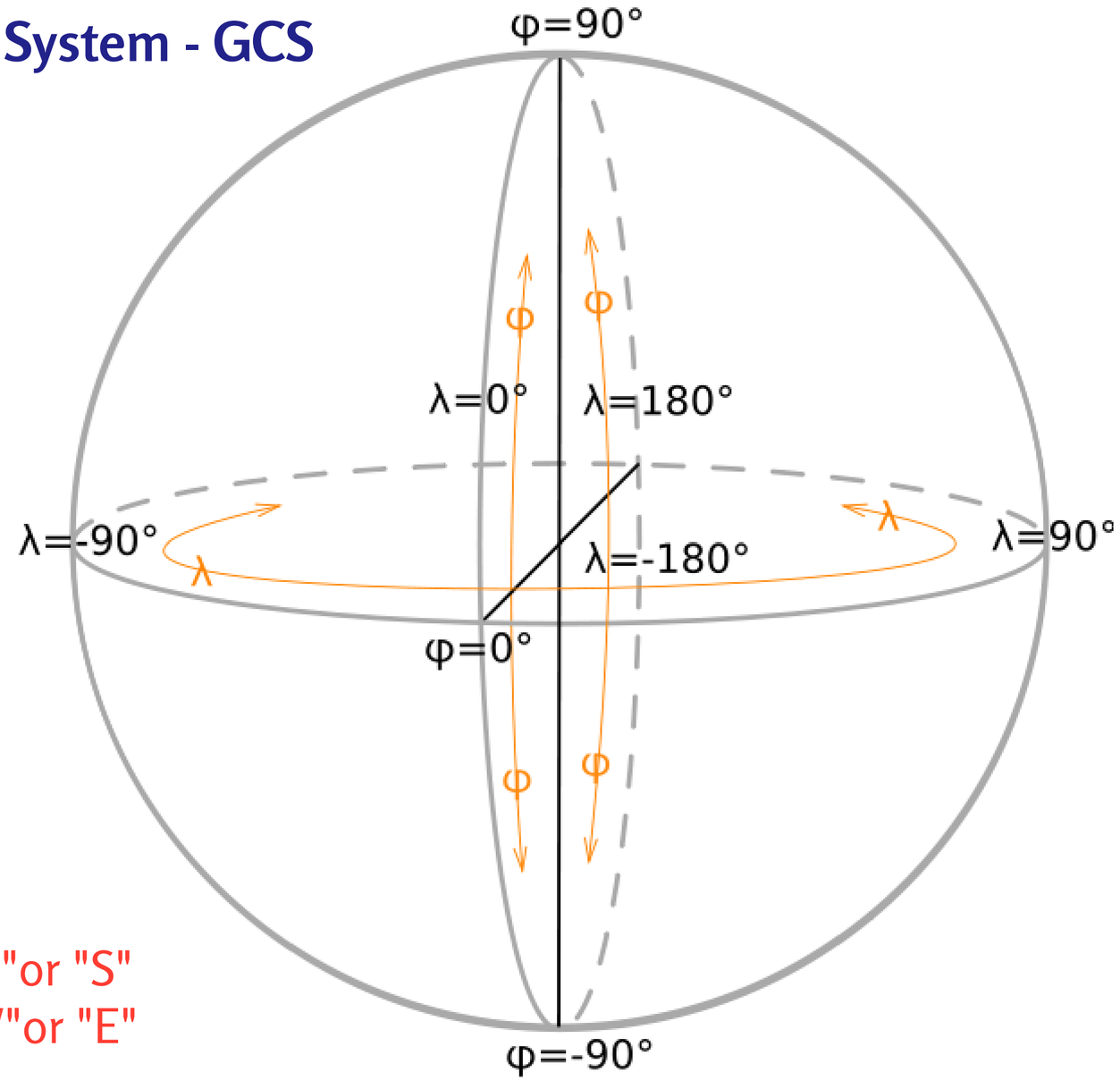


Fonte: Google Earth



Basic concepts: Coordinates Sistems

Geographic Coordinates System - GCS

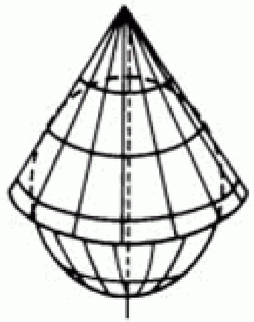


Botucatu
Lat: 22º 53’ 25’’ } "N"or "S"
Long: 48º 27’ 19’’ } "W"or "E"

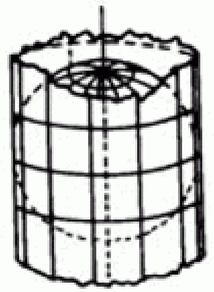
Basic concepts: Coordinates Sistems

Projected Coordinates System

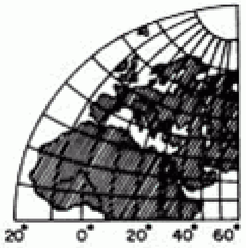
Projeção estereográfica polar



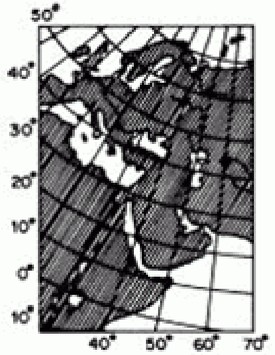
Projeção cônica de Lambert



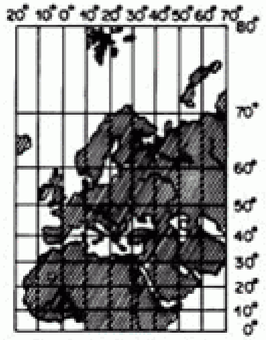
Projeção de Mercator



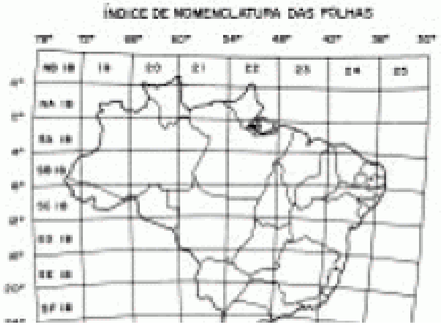
Projeção Plana



Projeção Cônica



Projeção Cilíndrica



Botucatu
Lat: 761064.00m
Long: 7466377.00m

} "Sectors"

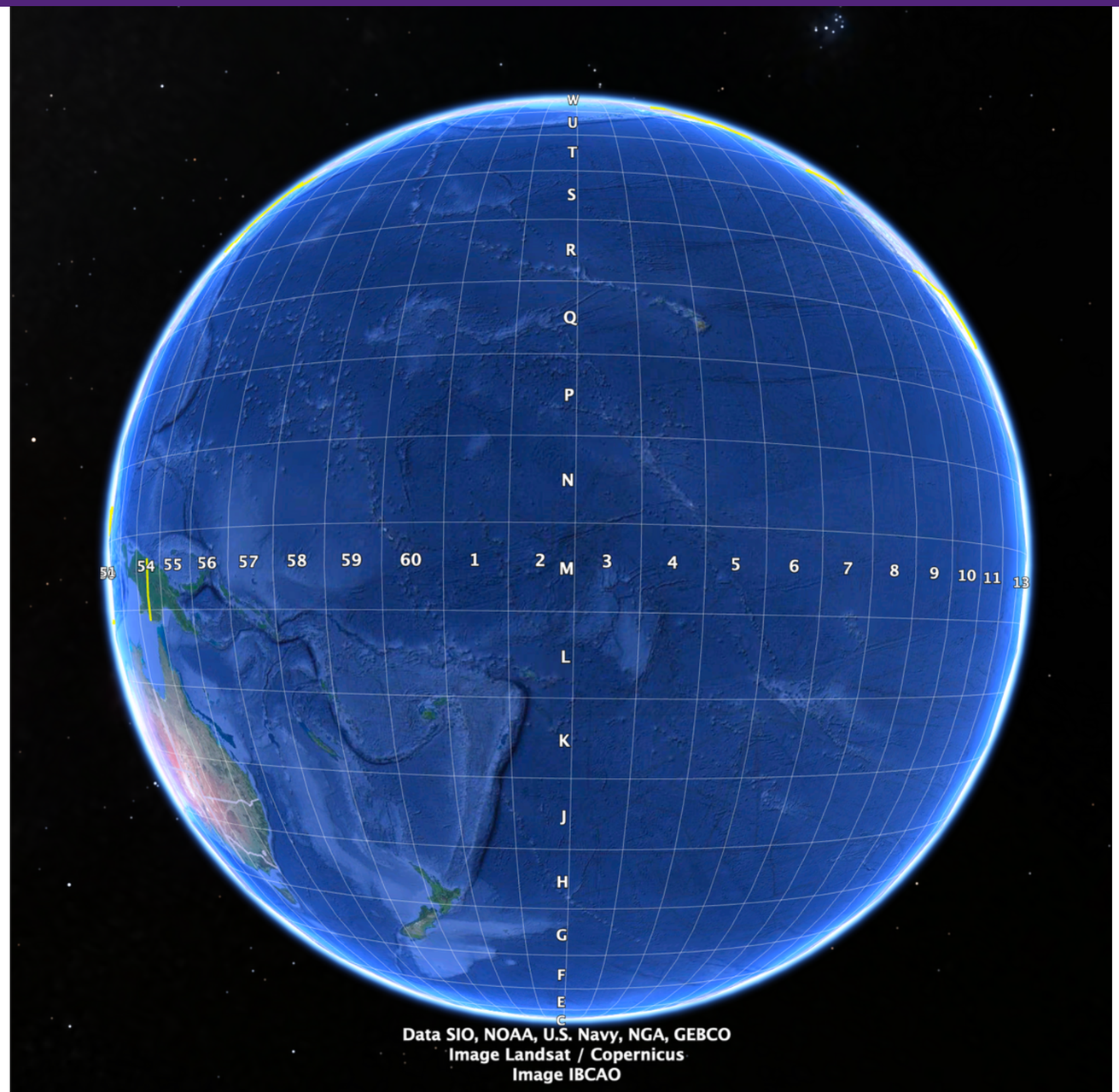
22 k

Fonte: http://imasters.com.br/artigo/12308/outros/sistemas-de-informacao-geografica/

Basic concepts: Coordinates Sistems

Long -> 1 - 60

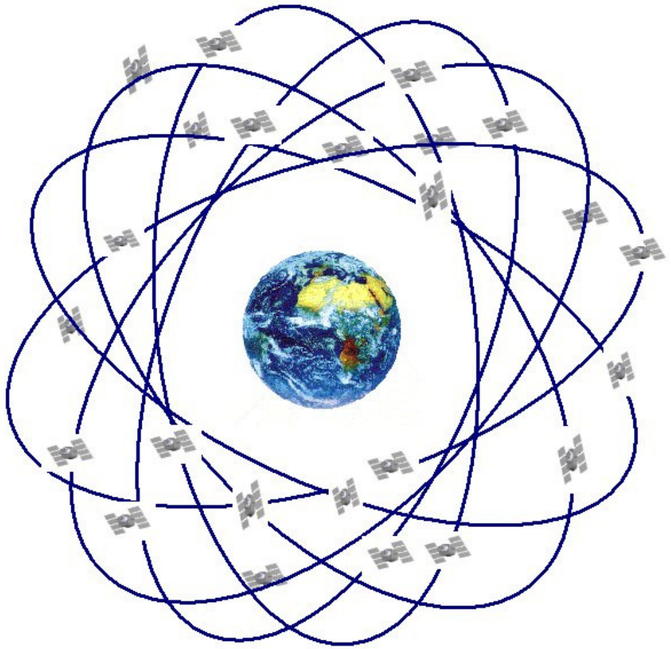
Lat -> C - X



Basic concepts: acquiring coordinates

Fonte: shoppingparaguai.info

Fonte: www.bomnegocio.com

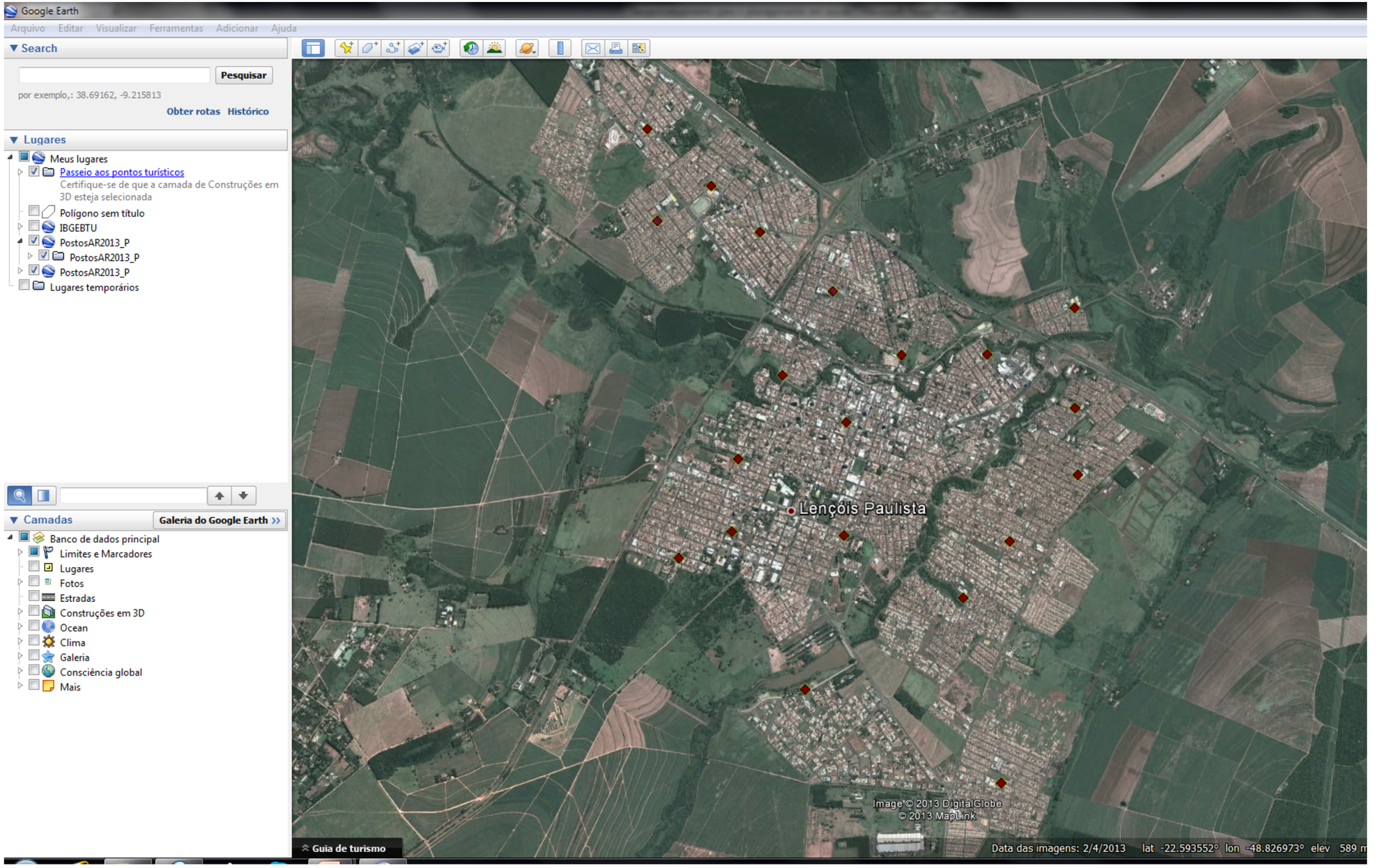


Fonte: blogdaagriculturadeprecisao.blogspot.com

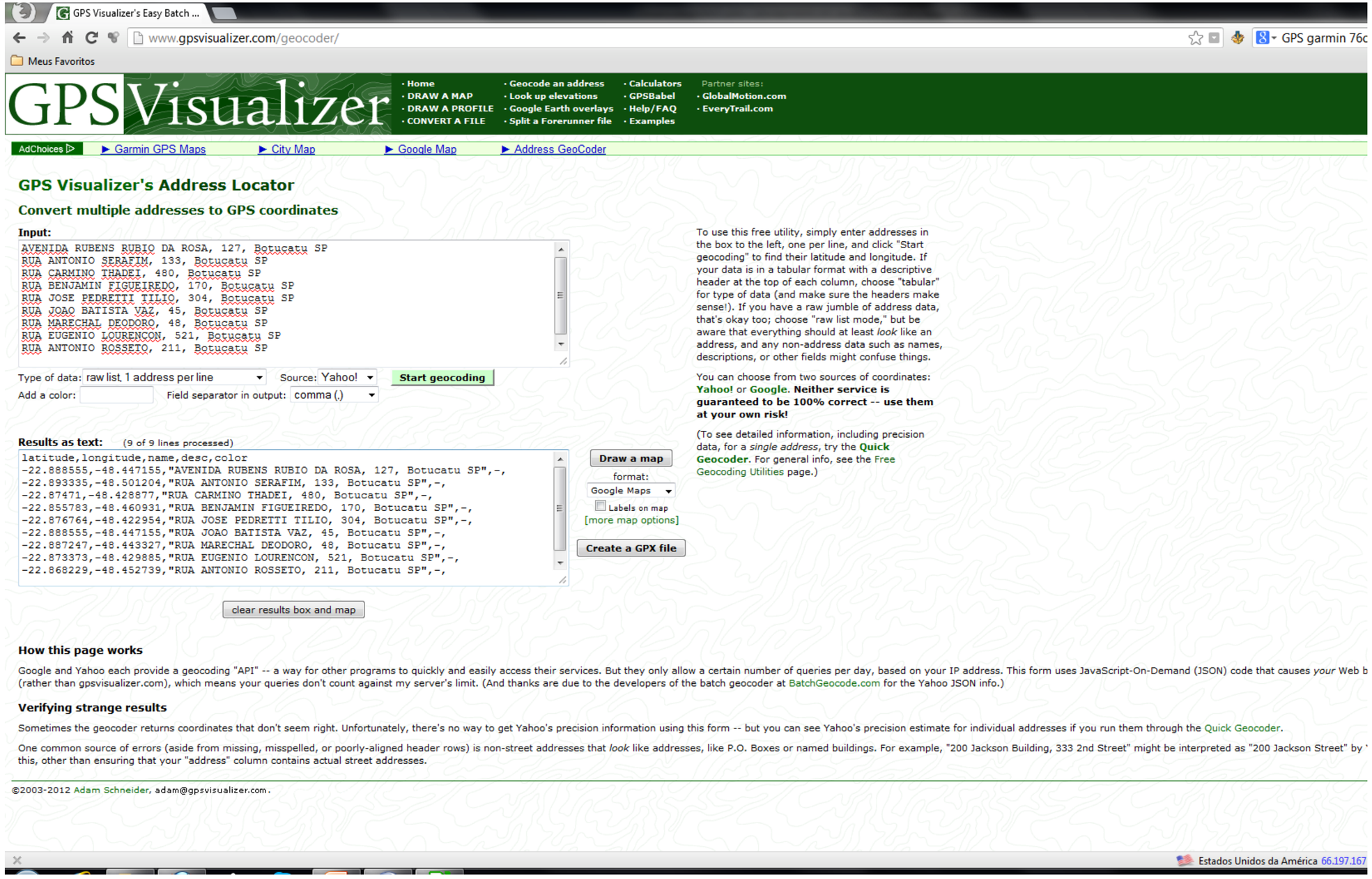
Fonte: www.lojautil.com.br

Fonte: www.guiadecelular.com.br

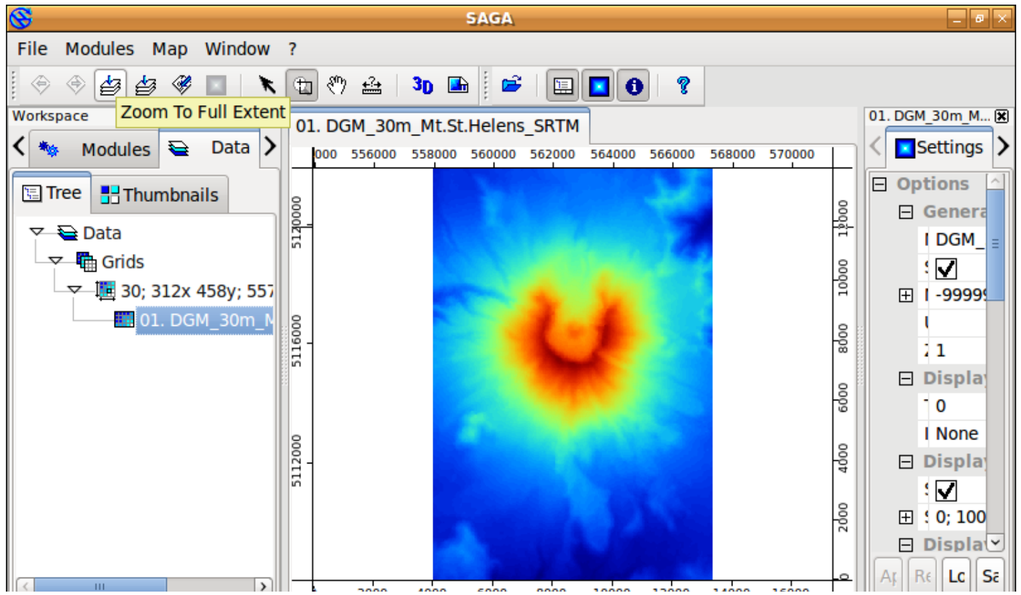
Basic concepts: acquiring coordinates

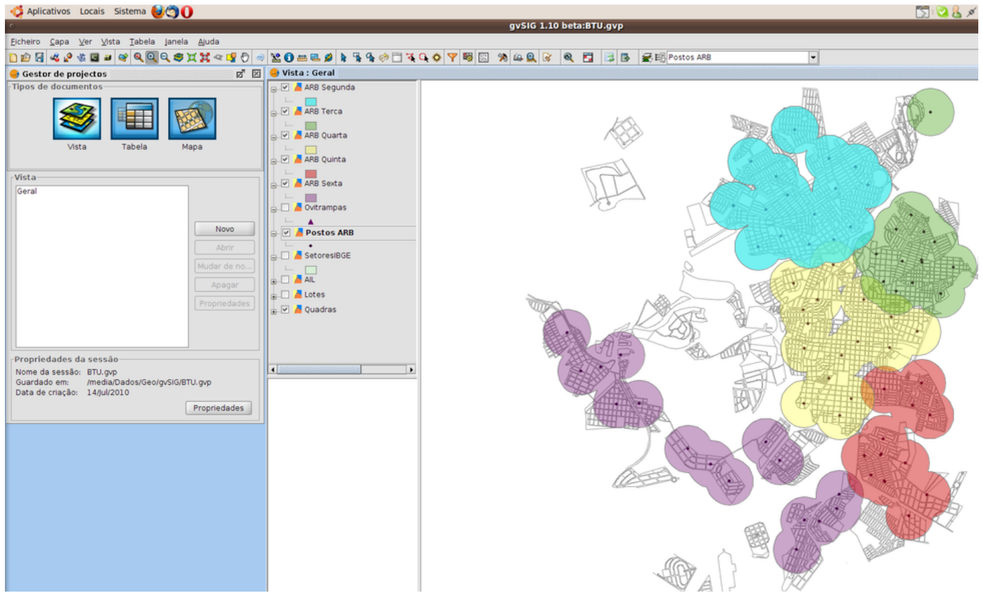


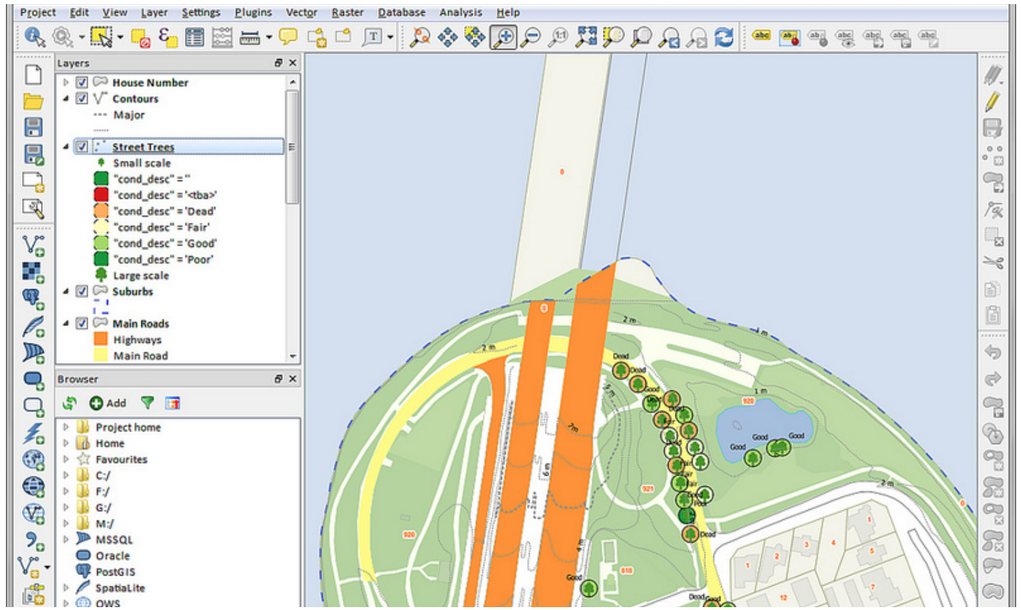
Basic concepts: acquiring coordinates

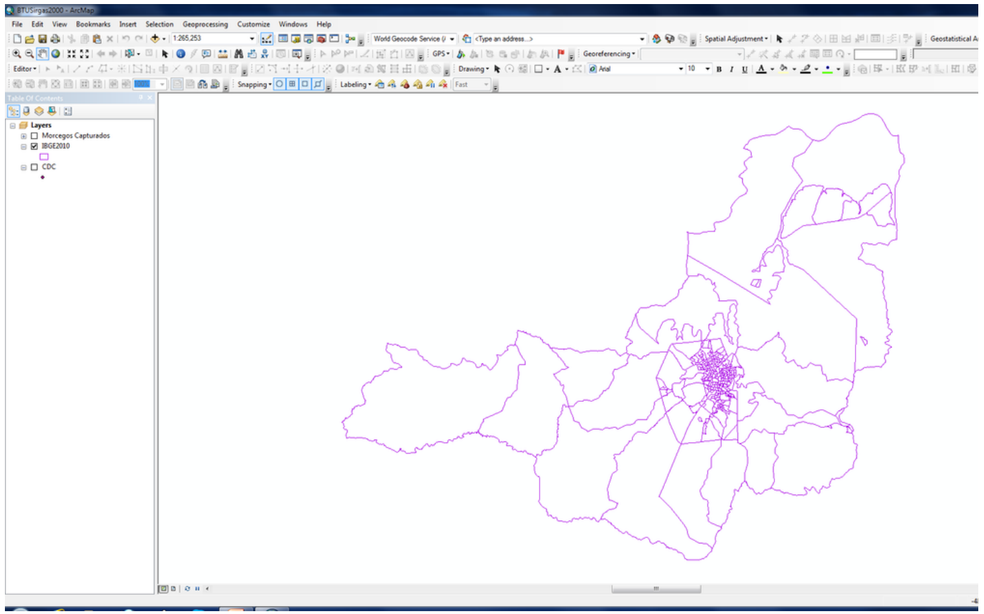


Basic concepts: GIS



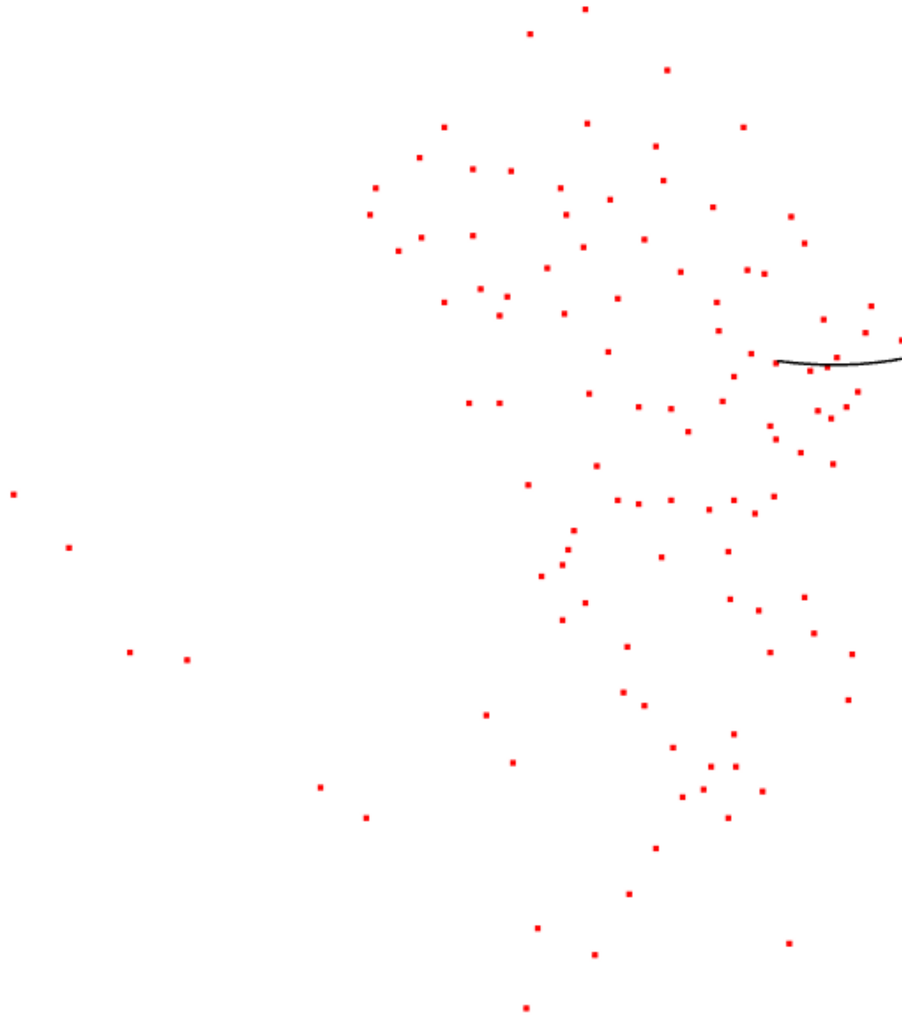






Basic concepts: vector data

Point data



A	B	C	D	E	F
ID	ID_ARM	COORDX	COORDY	N_OVOS	…
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2	OVI_2	781846	7487801	29	…
3	OVI_3	782082	7487876	18	…
4	OVI_4	782126	7487182	10	…
5	OVI_5	783094	7486822	12	…
6	OVI_6	783498	7486975	18	…
7	OVI_7	783102	7487491	22	…
.	.	.	.	.	
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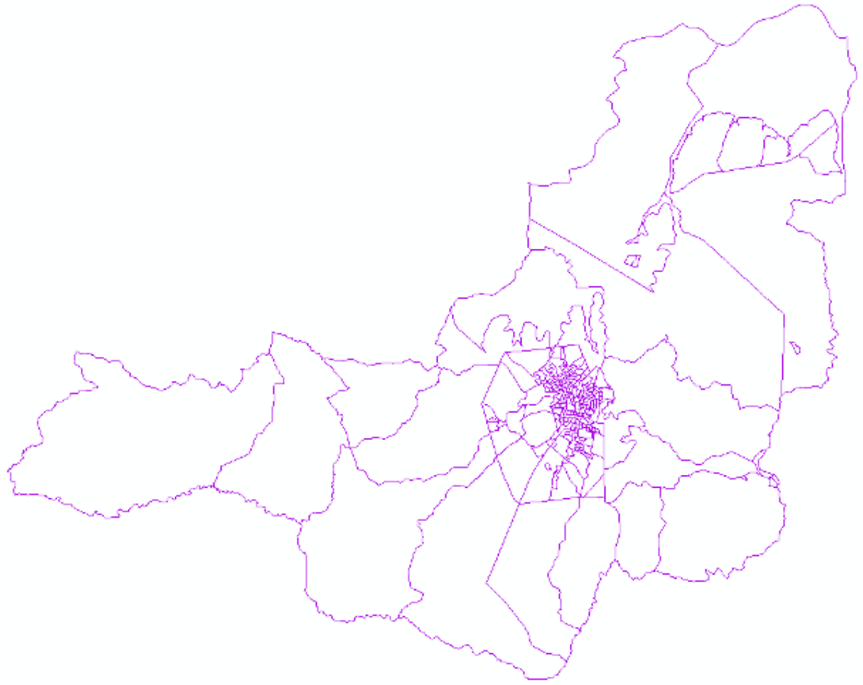
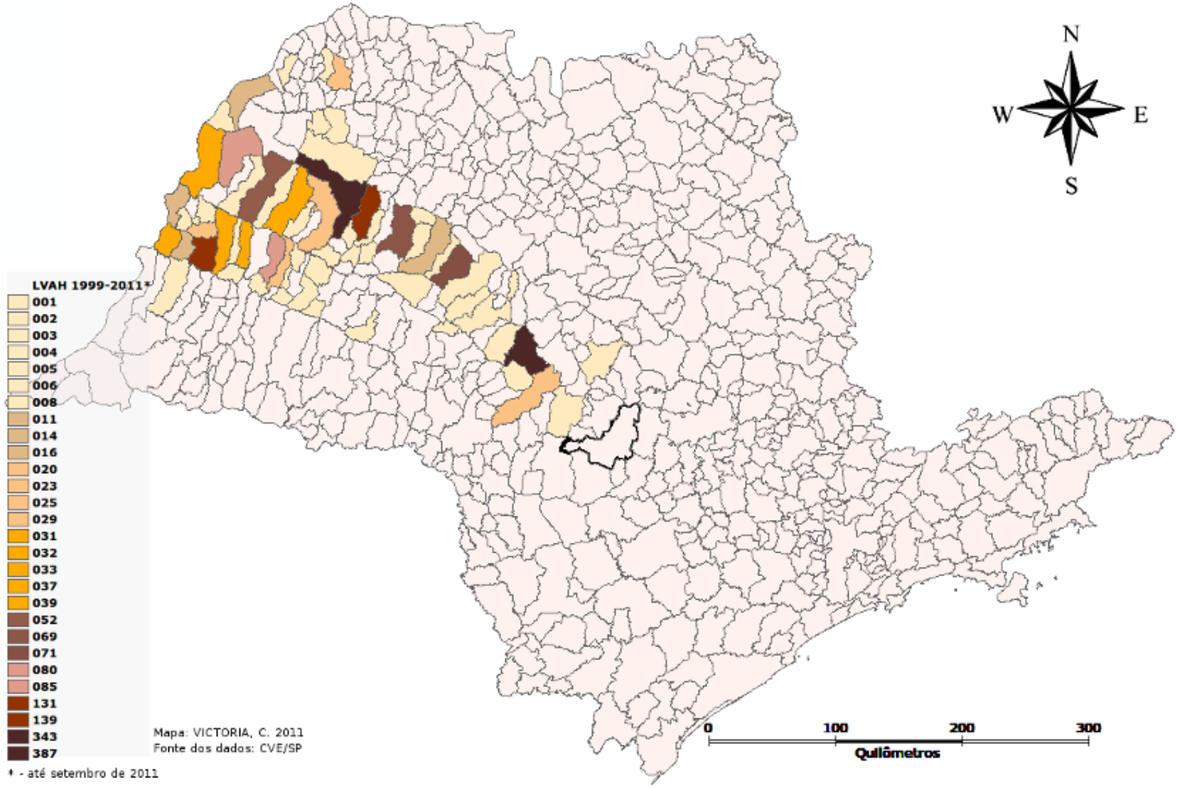
.	.	.	.	.	

Basic concepts: vector data

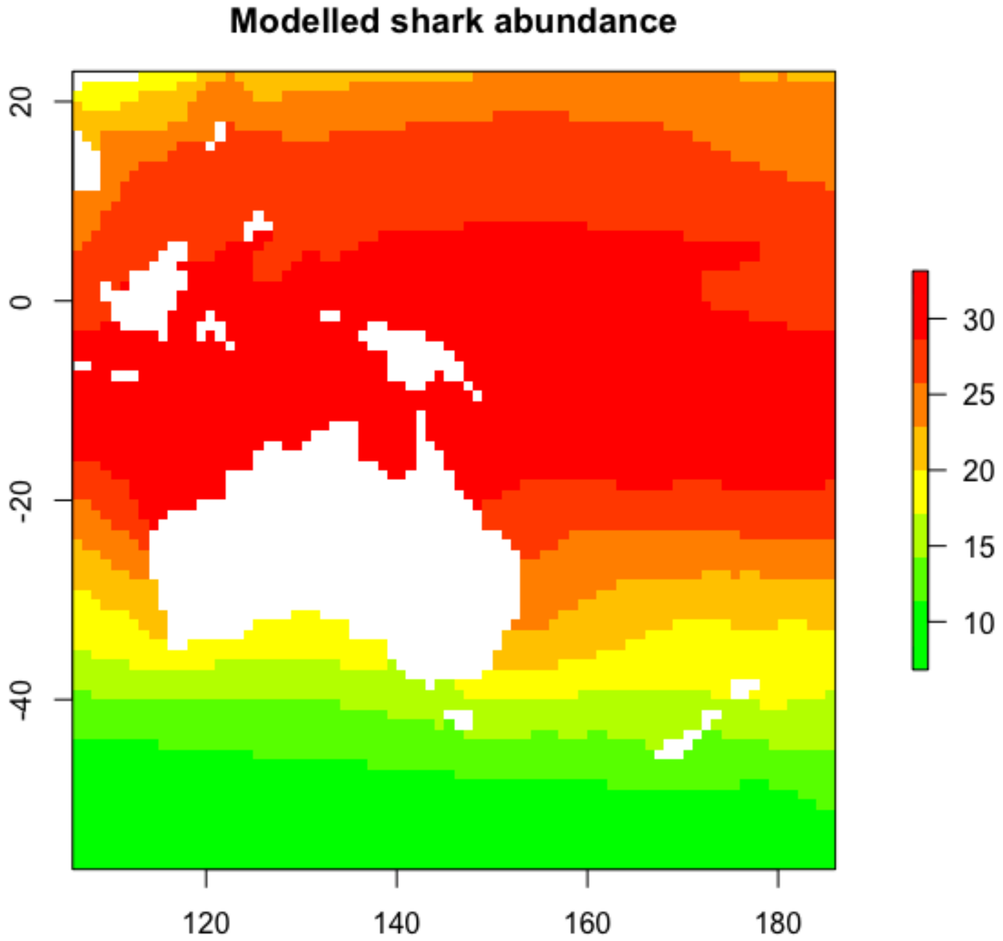


"centroids"

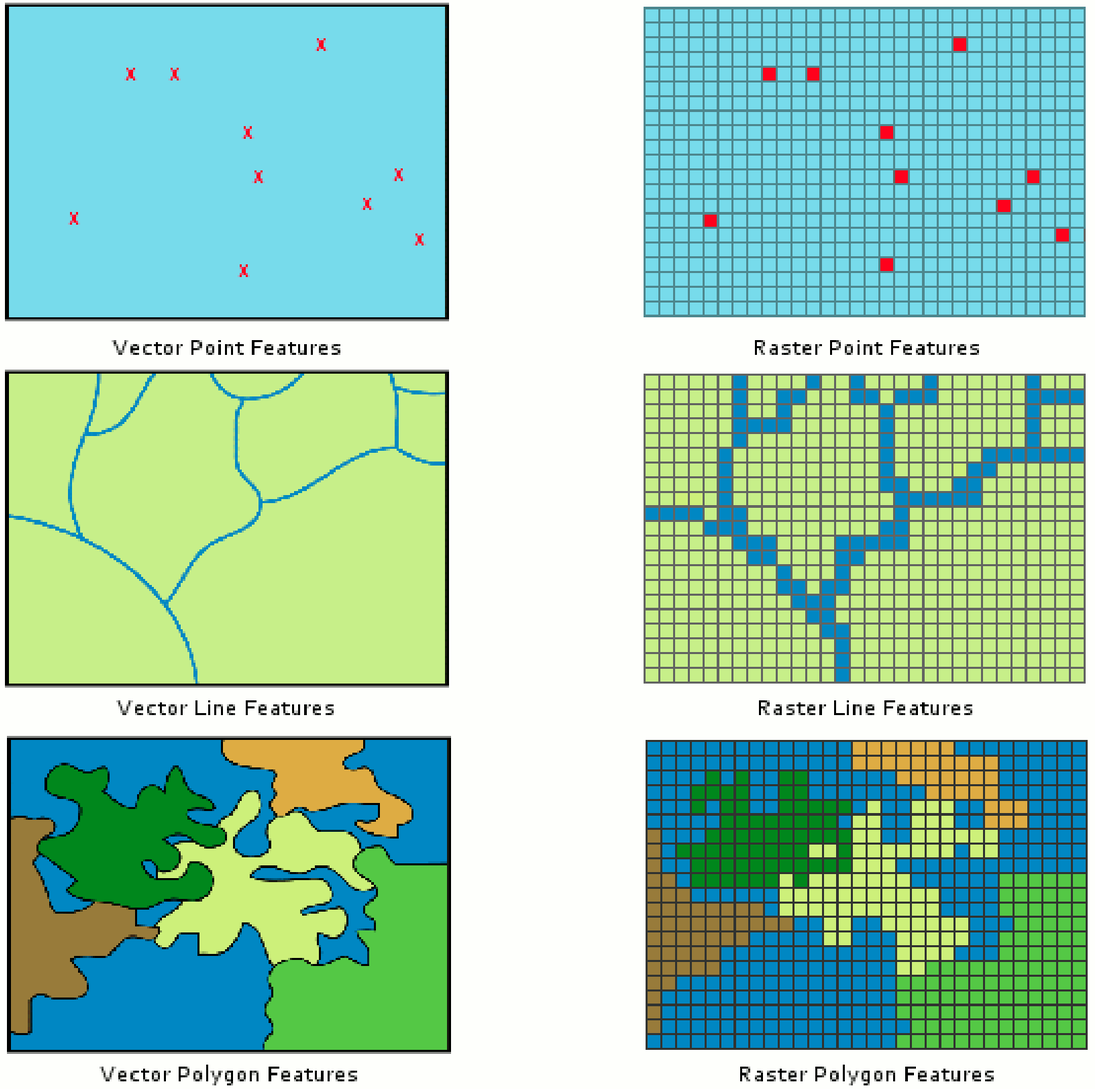
Area - "Polygon



Basic concepts: raster data



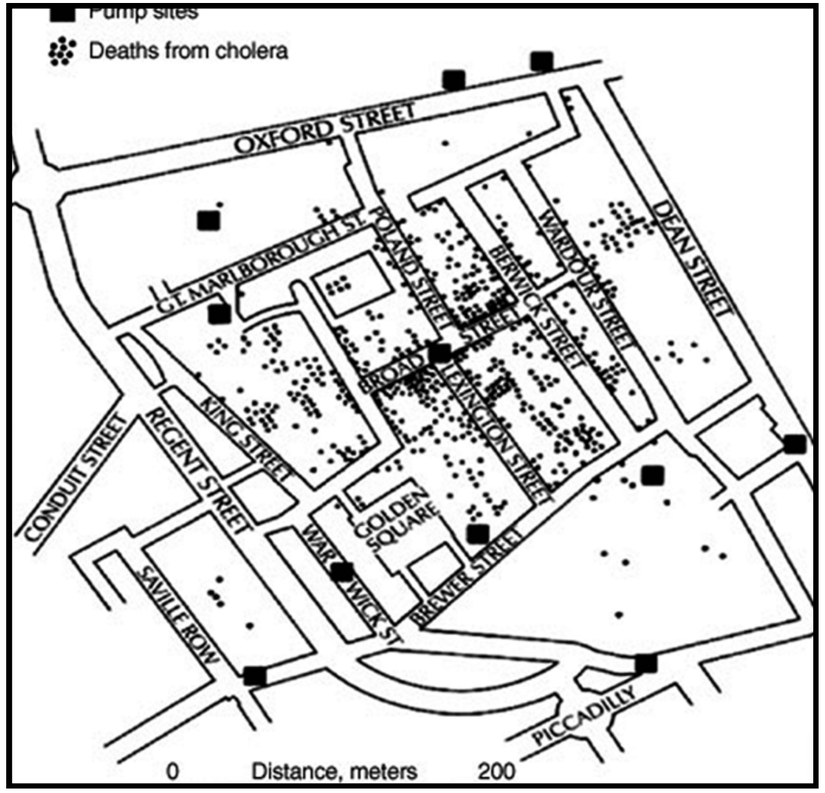
https://environmentalcomputing.net/graphics/spatial-vis/basic-raster/



http://google.com

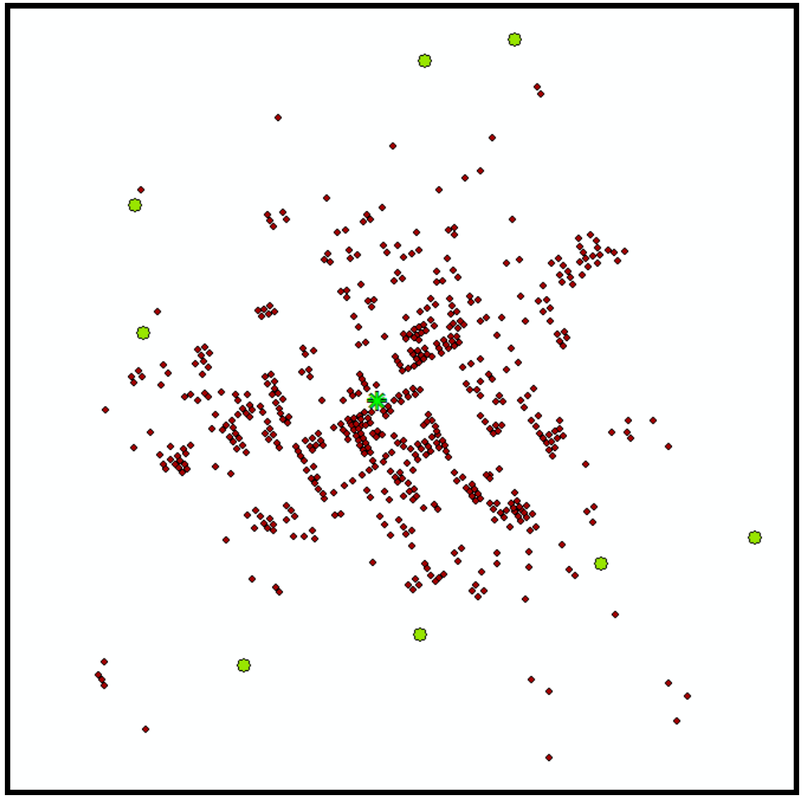
Basic concepts

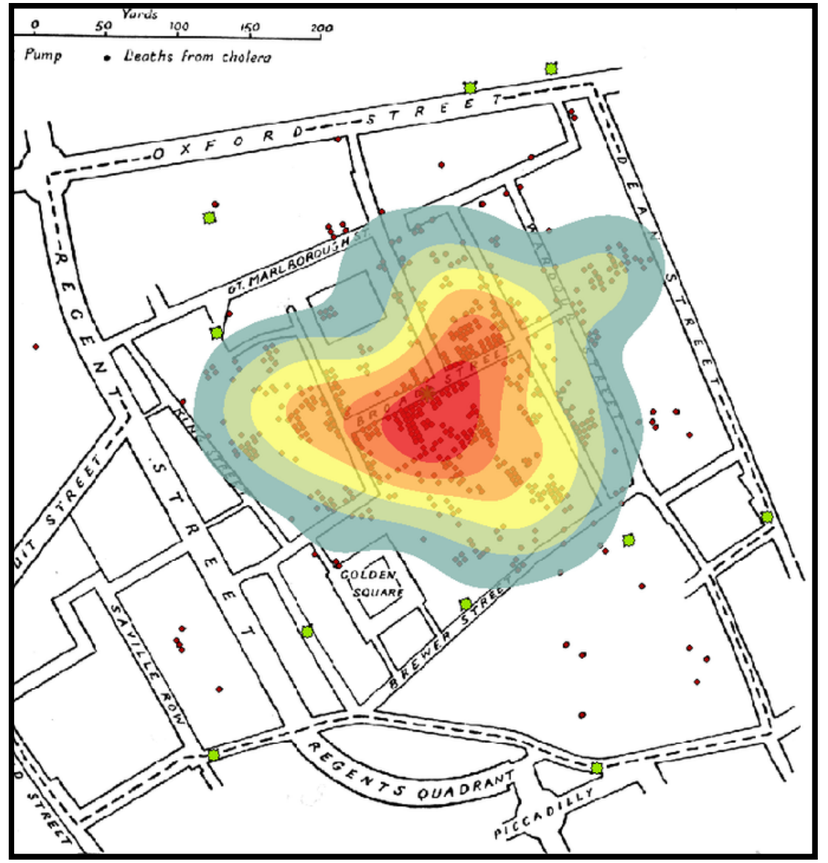
John Snow - 1854



Fonte: www.emeraldinsight.com

Fonte:www.londontown.com



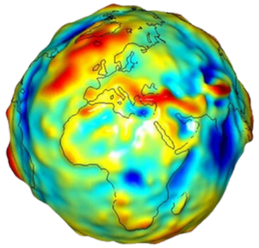


Kernel interpolator

Basic concepts: spatial databases

Basic concepts: spatial databases levels

"Real World"



GIS

Interface

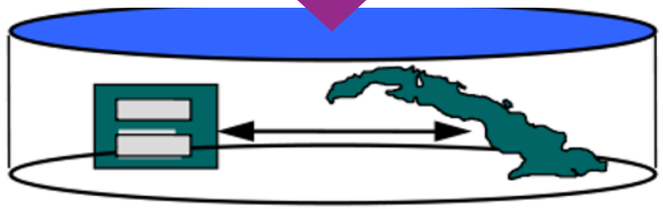
data entrance

query and spatial analisys

visualization

data managment

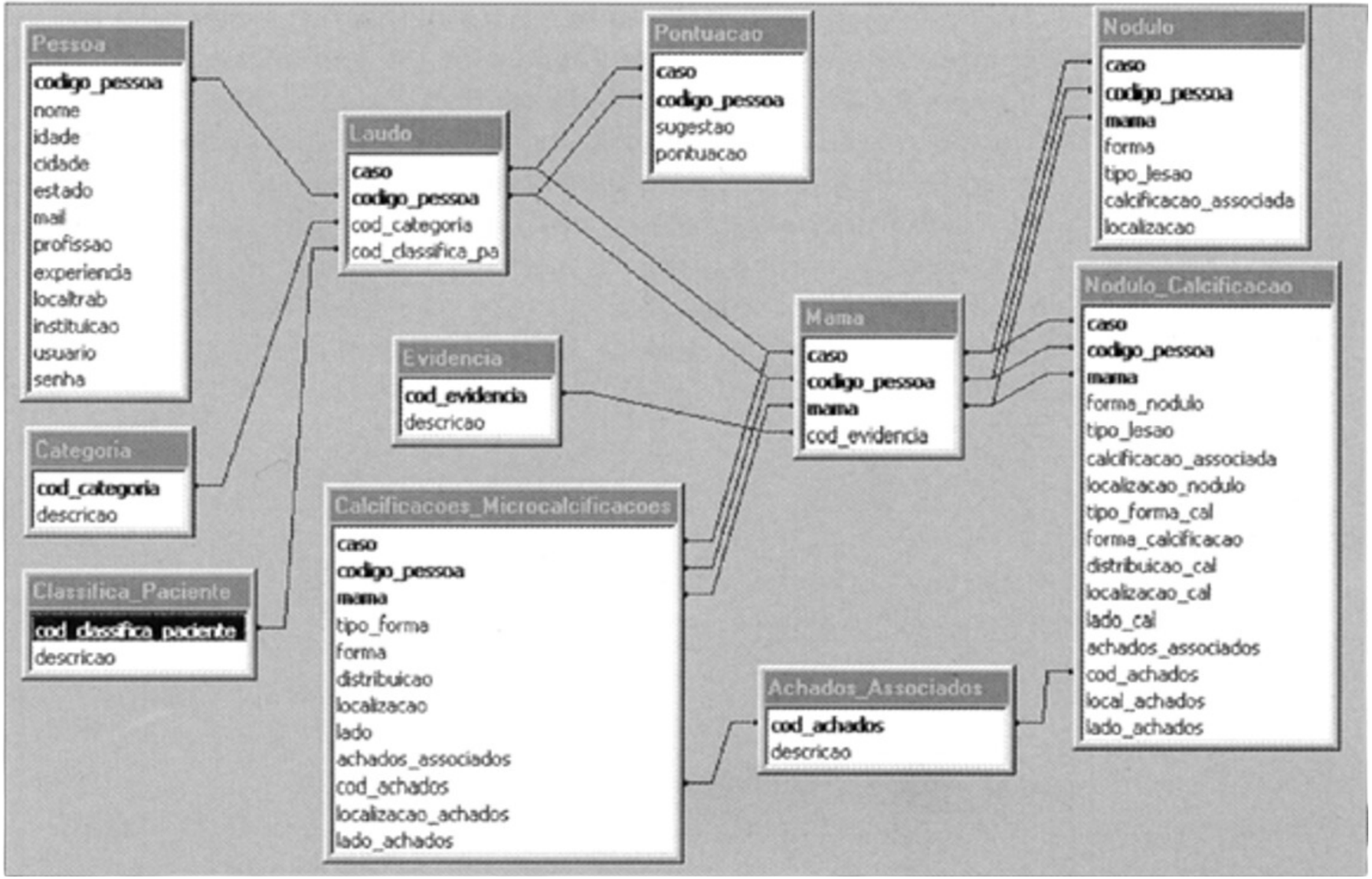
Databases



Basic concepts: spatial databases

Relational databases

"ID"



Basic concepts: "best practices tips"

Before starting !!!

Transform you data	**Datum and Coordinate systems**
Split your tables	**Base and data tables**
Number ID's	**Use numbers instead letters**
Scale	**Set scales**
Maps	**Define map output size beforehand.** **Define map output extension beforehand.**

THE UNIVERSITY OF QUEENSLAND AUSTRALIA | CREATE CHANGE

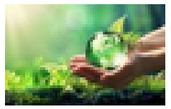
Questions & Comments

Cassiano Victoria
Professor Doctor

Spatial Epidemiology
Geoprocessing and Geostatistics
Veterinary Public Health

UNIVERSIDADE ESTADUAL PAULISTA
"JÚLIO DE MESQUITA FILHO"

São Paulo State University - UNESP
School of Veterinary Medicine and Animal Science
Depart. of Animal Production and Preventive Veterinary Medicine
District of Rubiao Junior - Postal Code: 18618-681
Botucatu - Sao Paulo State - Brazil - P.O.Box: 560
Voip: +55 14 3880-2099 Mobile: +55 14 99798-2046
email: cassiano.victoria@unesp.br



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