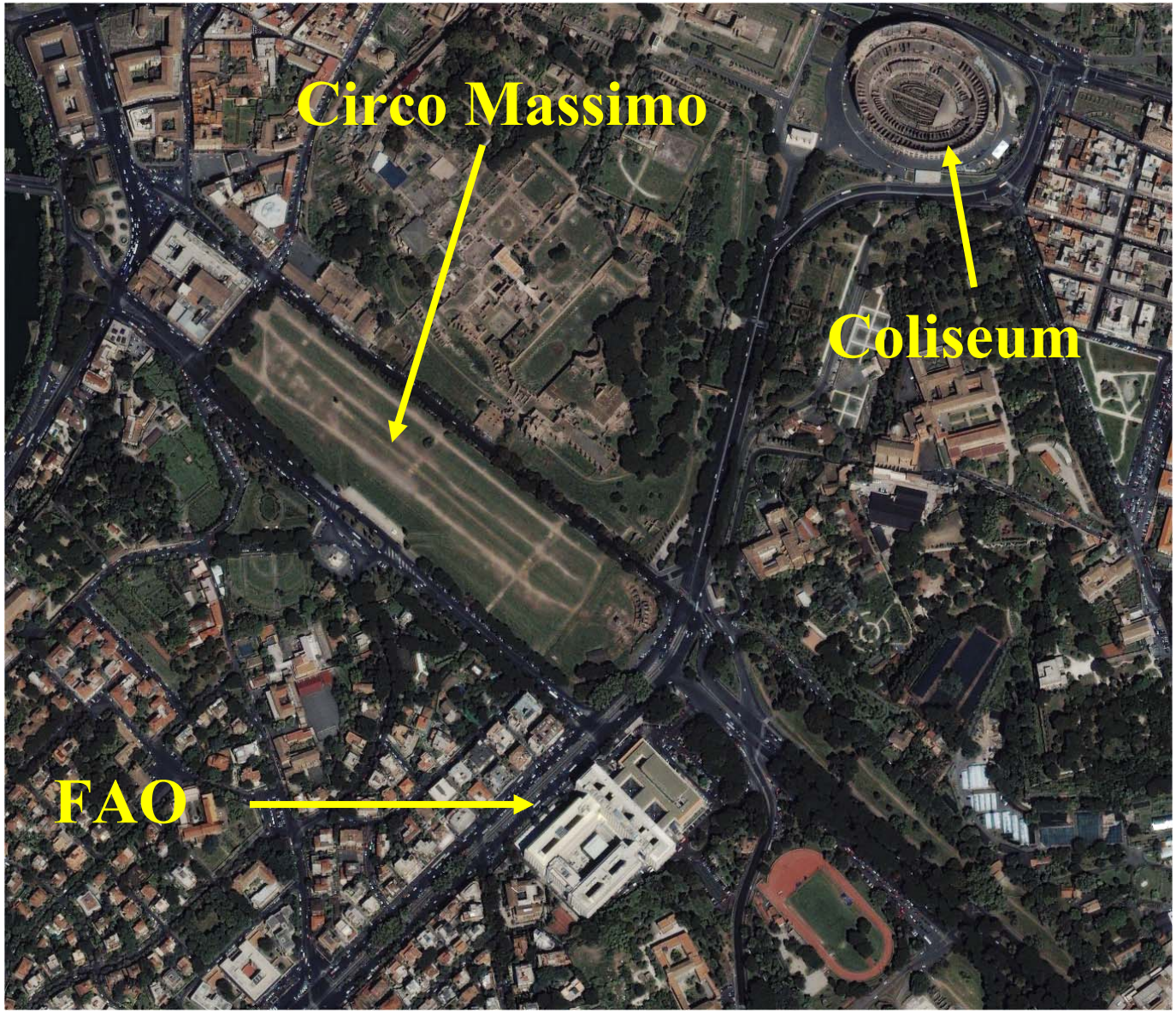
Food and Agriculture Organization
of the United Nations
AgroMetShell Workshop
15-17 September 2003
Rome, Italy

Other FAO software related to AgroMetShell

Michele Bernardi

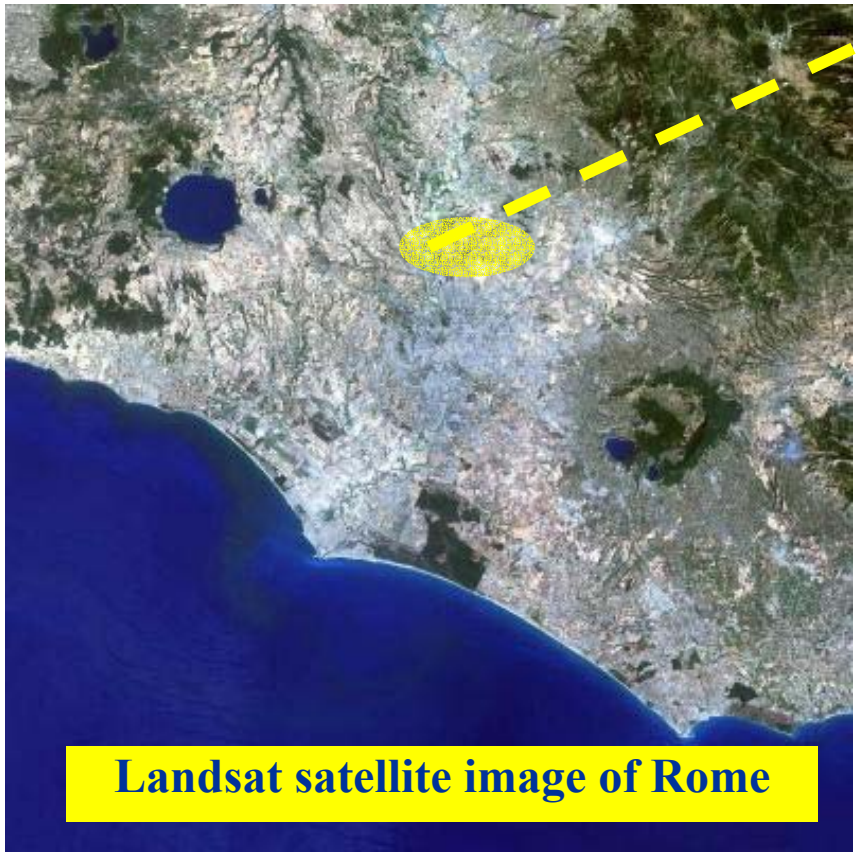
Environment and Natural Resources Service
Agro-meteorology Group

FAO

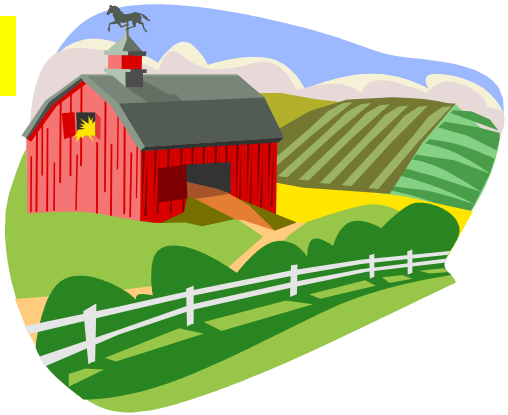


Satellite photograph of Rome

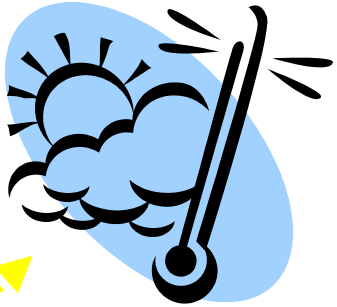
Climatic data needs



Farm



Weather



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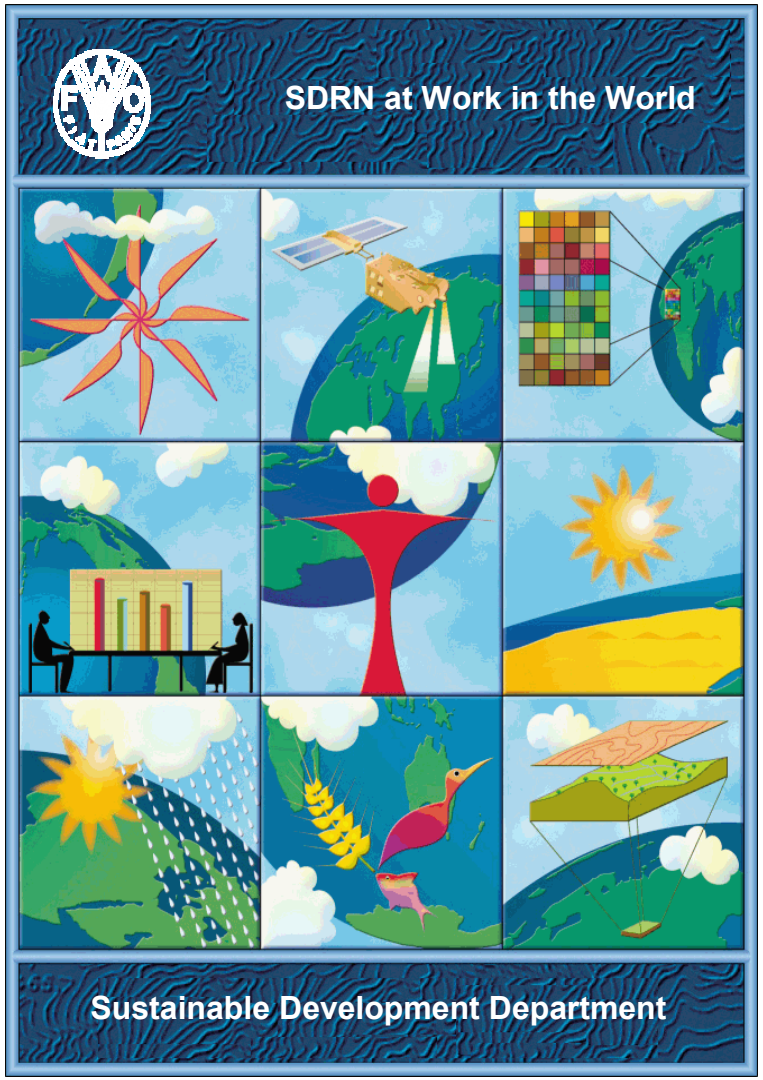
Crop

Environment and Natural Resources Service (SDRN)



It's the integrated response to FAO's environmental and natural resources programme requirements.

SDRN deals with sustainable development and natural resources and environment management issues in order to:

- develop spatial information infrastructures that enable information access, sharing and lower costs;
- promote integrated data and information use for food security and sustainable development;
- develop methodologies, guidelines and policies for resource management and environmental monitoring.

SDRN has a multidisciplinary team of experts in geographical information systems, remote sensing, agro-meteorology, environment, energy, ecology, and economics.

Geographic Information System (GIS)

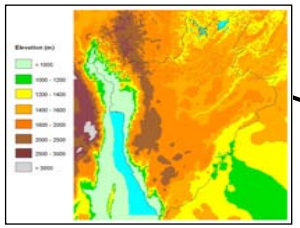
GIS is used to integrate, process, analyse and display digital spatial and non spatial data. Layers of thematic information can be integrated to provide new insights into sustainable development problems.

GIS refers to computerised information storage, processing and retrieval systems, specifically designed to cope with spatial data and its corresponding attribute information.

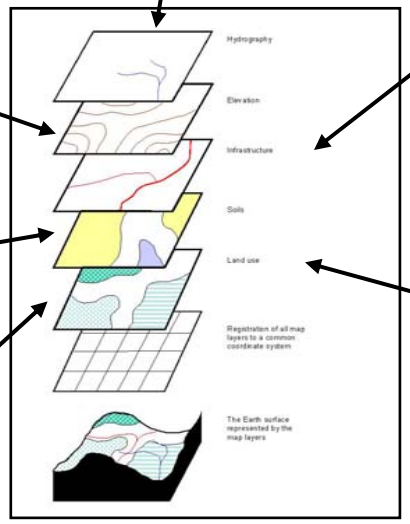
In this example, many thematic layers were integrated to obtain a GIS information infrastructure for Burundi.

Layer 1: Hydrography rivers and lakes

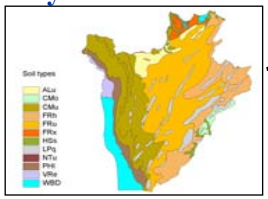
Layer 2: Elevation contours

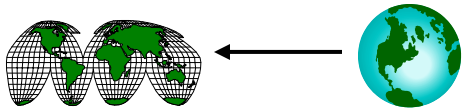


Layer 3: Infrastructure



Layer 4: Soils

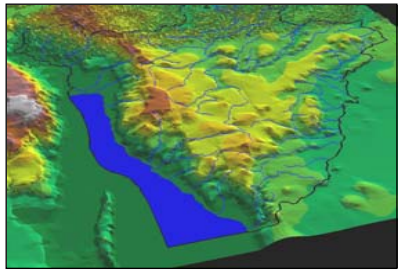




Original data can be from a range of projections and scales.

Layer 5: Major land-cover types

Several layers are combined in this GIS output. The 3D effect is generated by the GIS from the elevation data.



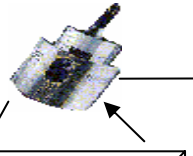
Advanced Real-Time Environmental Monitoring Information System (ARTEMIS)

Since August 1988, ARTEMIS has been operationally receiving, processing, archiving and disseminating low-resolution remote sensing imagery in support of FAO's programmes on early warning for food security, migrant pest and disease control.

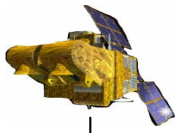
The ARTEMIS system was implemented by FAO in close co-operation with NASA Goddard Space Flight Centre, USA, the National Aerospace Laboratory (NLR) of the Netherlands and the University of Reading, U.K. with funding support from the Government of the Netherlands.

The ARTEMIS archive contains products derived from four different series of satellites by a number of processing centres and are available at daily, 10-daily, bi-weekly and/or monthly intervals.

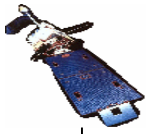
They can be seen at **http://METART.FAO.ORG**



EUMETSAT
Darmstadt, Germany



CNES
Toulouse, France



NOAA/NESDIS
Suitland, USA

NASDA/JMA
JAPAN

SSC
Kiruna, Sweden

University of Miami
Miami, USA

NOAA-CPC
Suitland, USA

VITO
Mol, Belgium

NASA GSFC
Greenbelt,
USA

Japan Met.
Agency
Tokyo, Japan

USAID
FEWS

EC/JRC/SAI
Ispra, Italy

USAID
FEWS

FAO-ARTEMIS

USERS

FAO Global Information
and Early Warning System
on Food and Agriculture
(GIEWS)

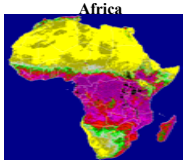
FAO Emergency Centre for
Locust Operations (ECLO)

FAO Animal Health Service
(AGAH)

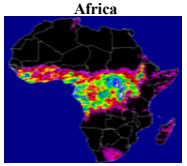
Southern Africa Development
Community, Regional
Remote Sensing Unit
(SADC)

Various national and international
research organisations

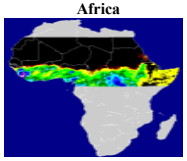
Normalized Difference
Vegetation Index
Africa



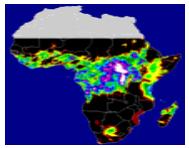
Cold Cloud Duration
Africa

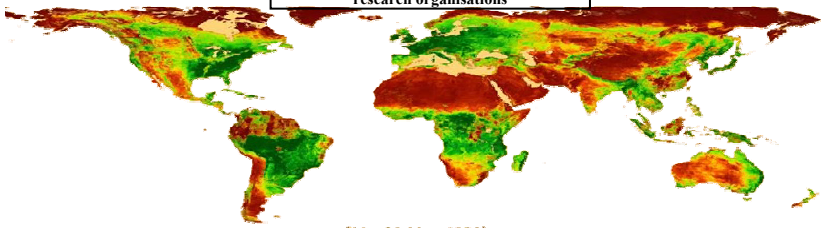


Estimated Rainfall
Africa

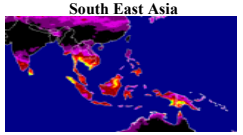


Estimated Rainfall
Africa

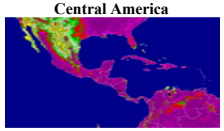




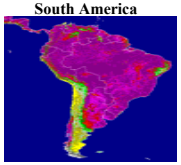
Cold Cloud Duration
South East Asia



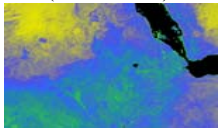
Normalized Difference
Vegetation Index
Central America



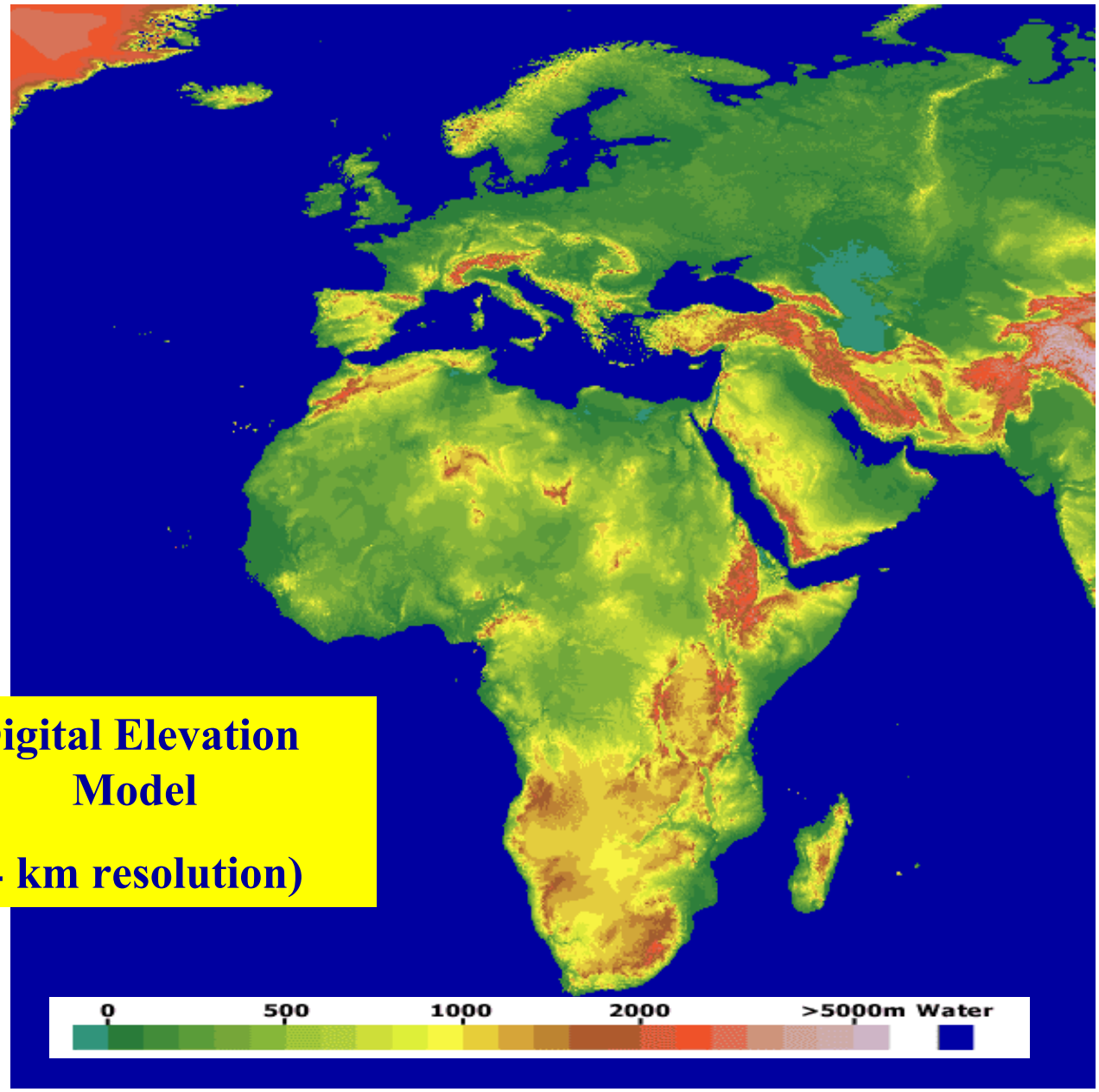
Normalized Difference
Vegetation Index
South America



Short Wave Infrared
(VEGETATION)



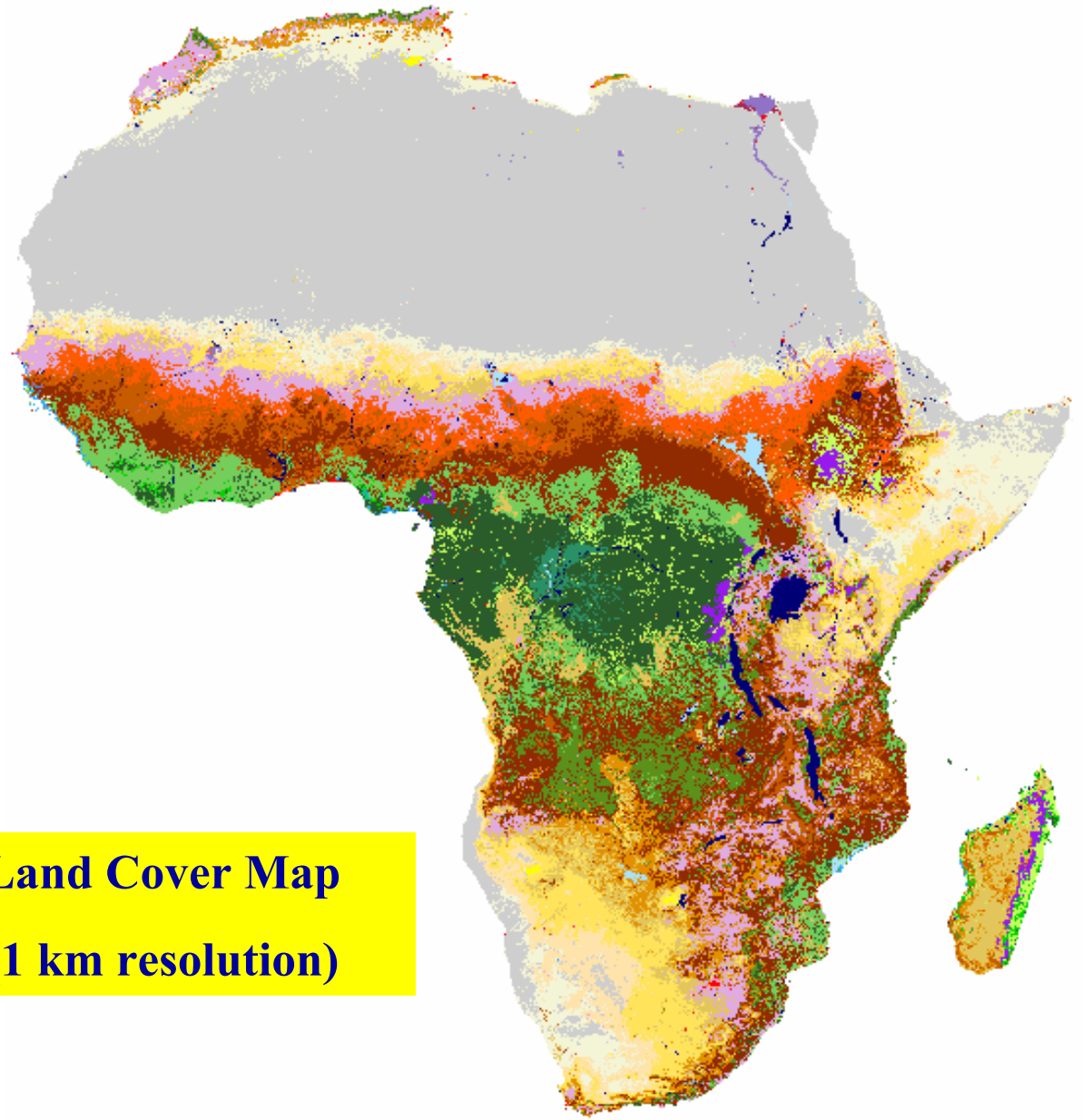
Satellite imagery



Digital Elevation Model

(4 km resolution)

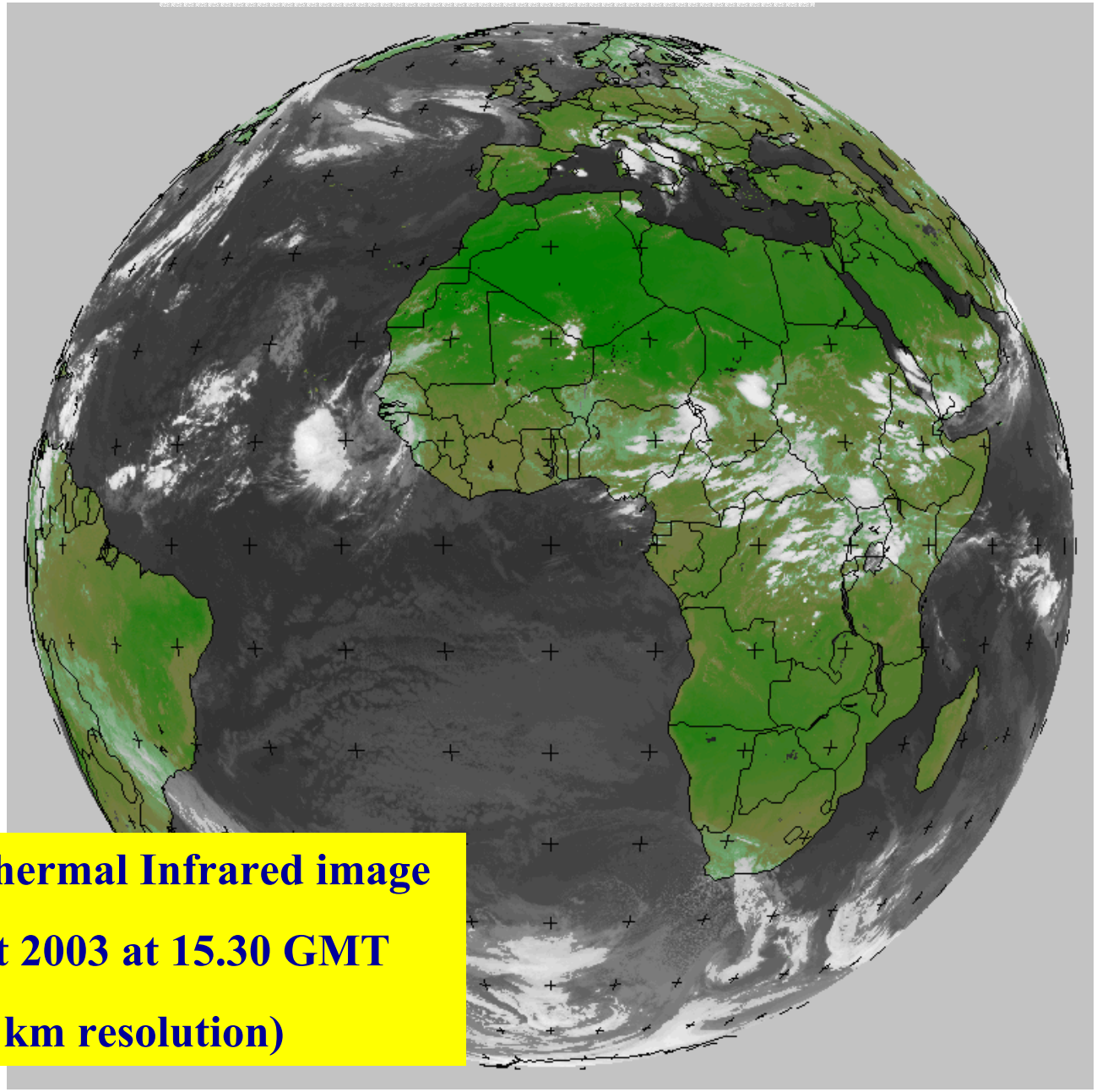
Satellite imagery



Land Cover Map

(1 km resolution)

Satellite imagery



Meteosat Thermal Infrared image

25 August 2003 at 15.30 GMT

(2.5 km resolution)

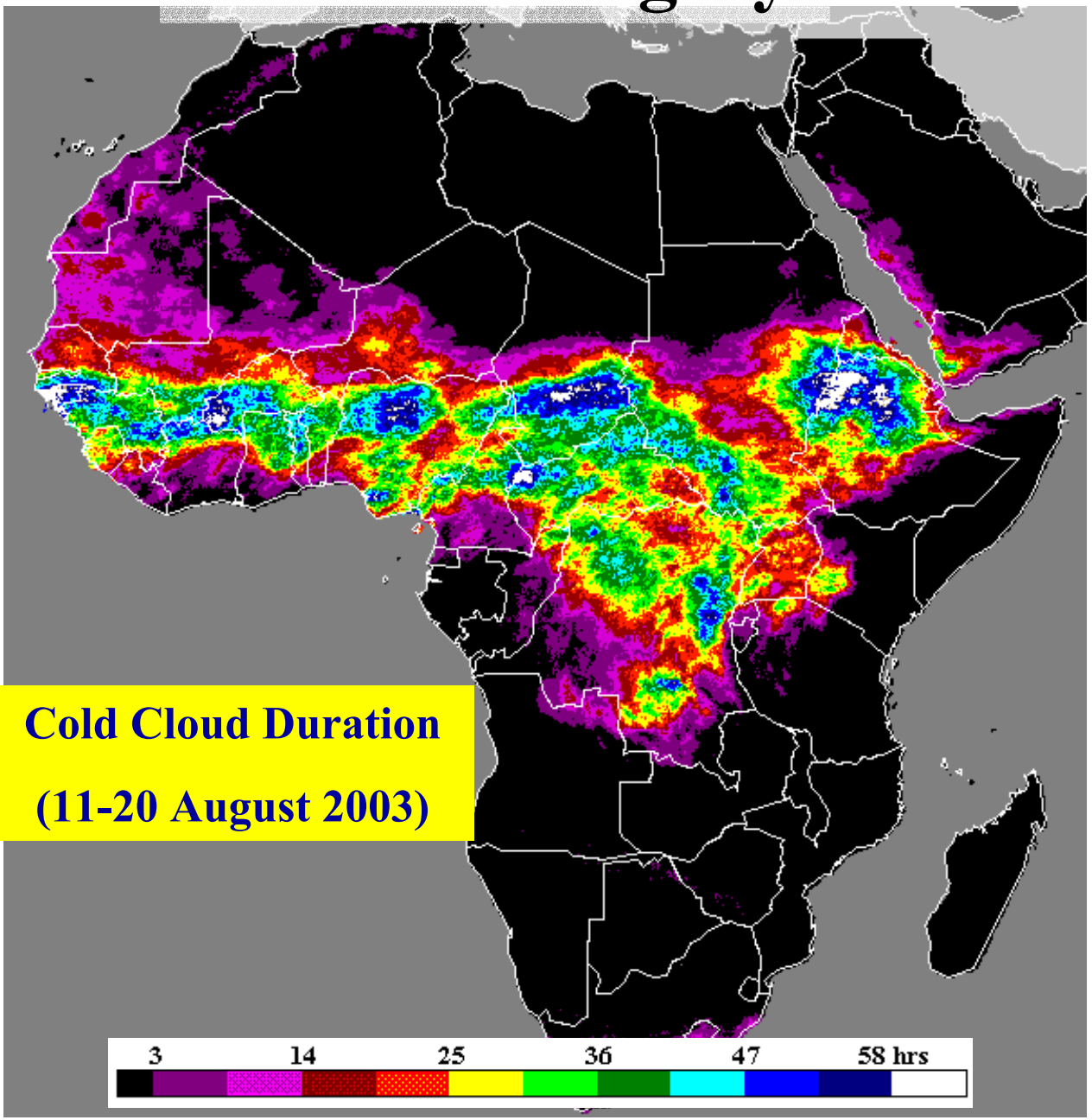
Satellite imagery

Meteosat Second Generation composite image

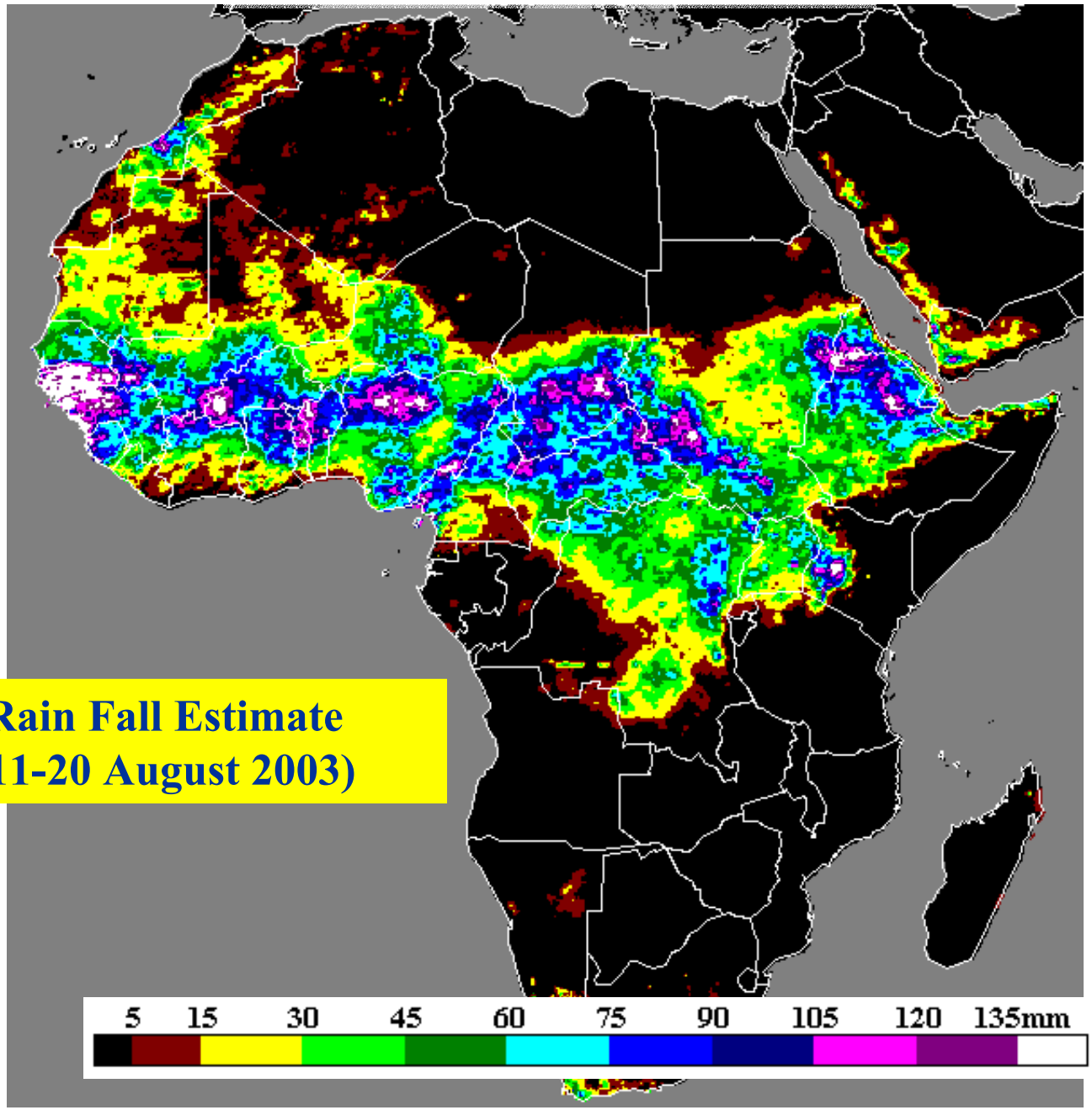
10 August 2003 at 12.00 GMT

(1 km resolution)

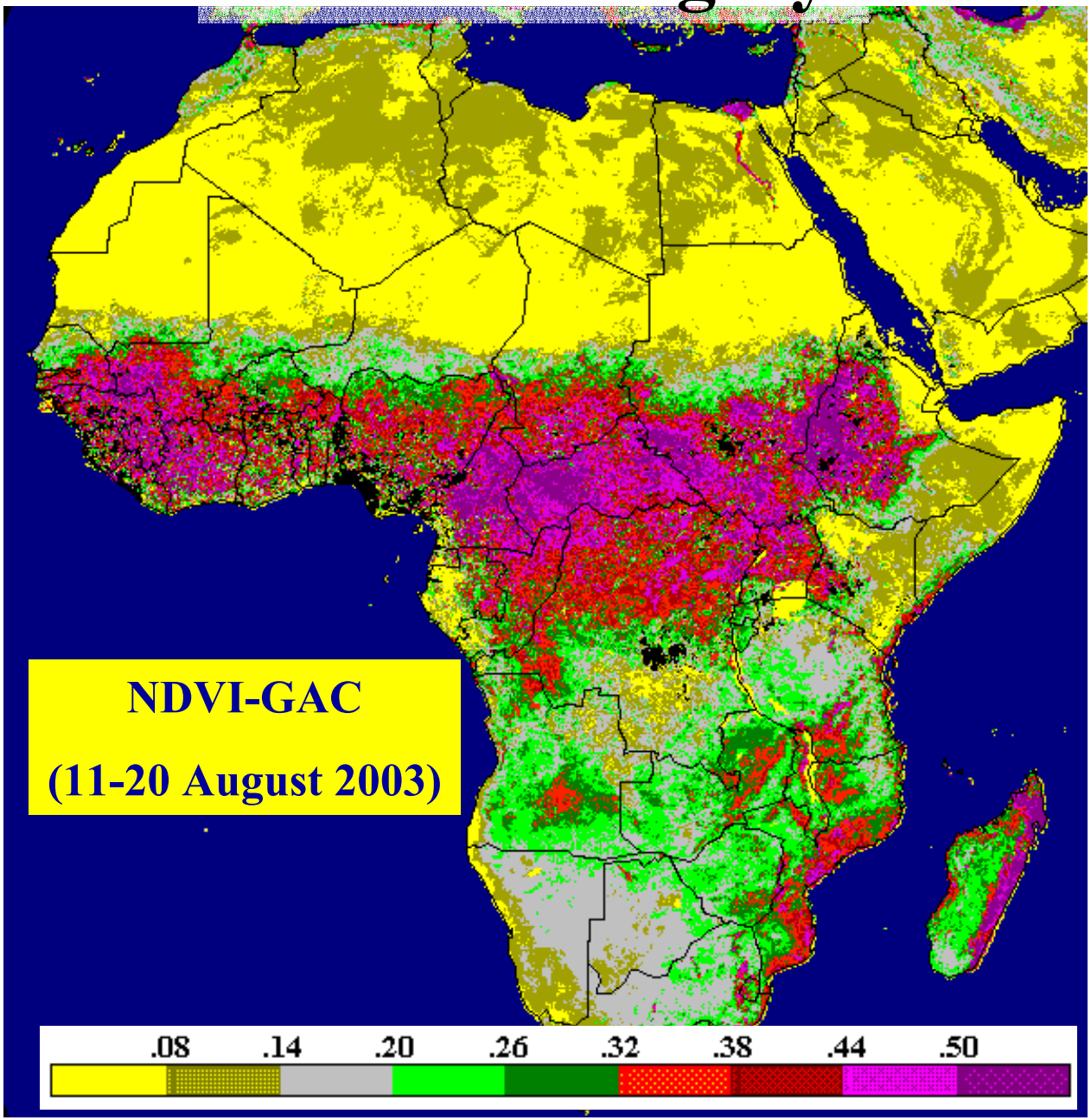
Satellite imagery



Satellite imagery

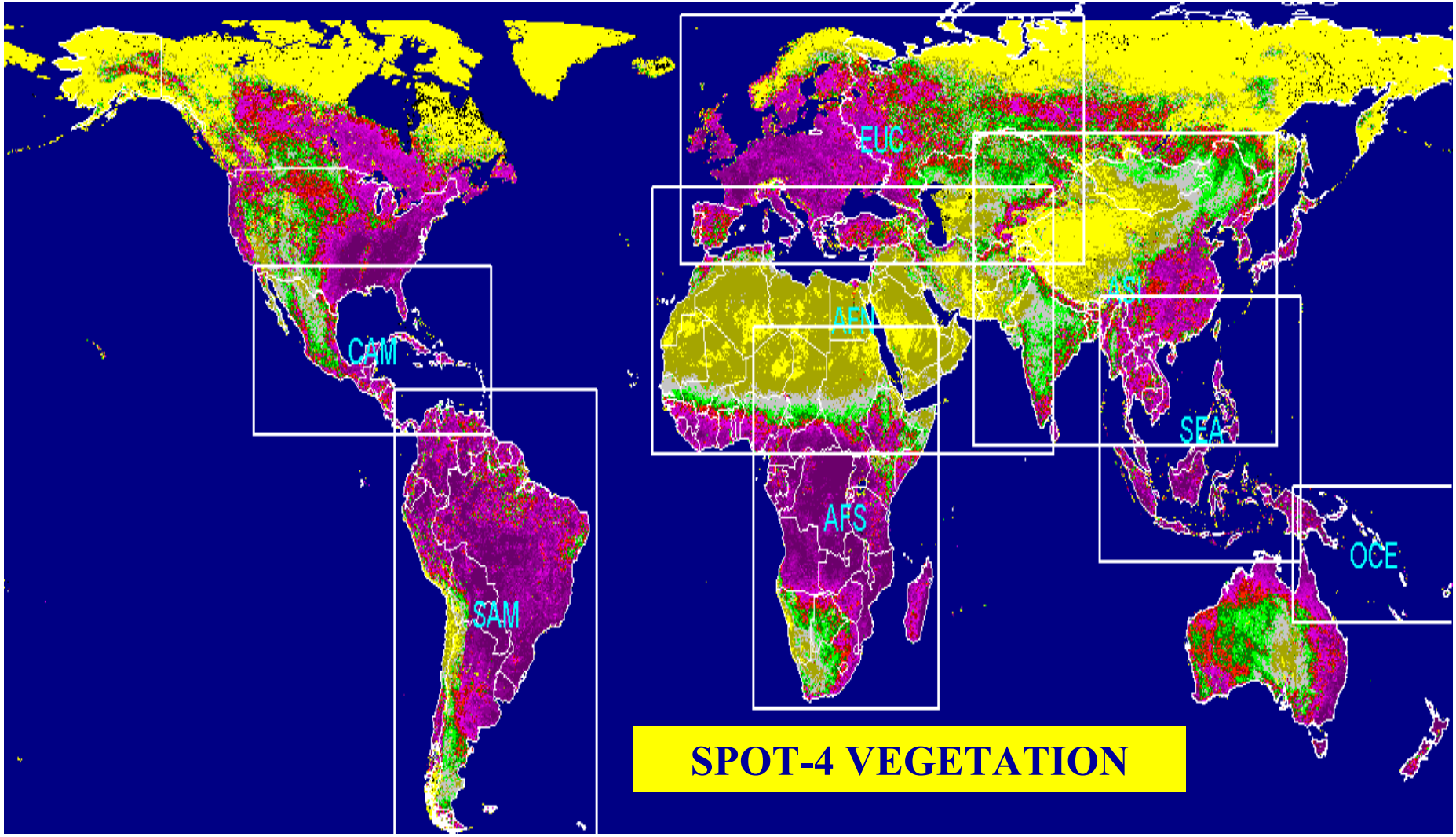


Satellite imagery

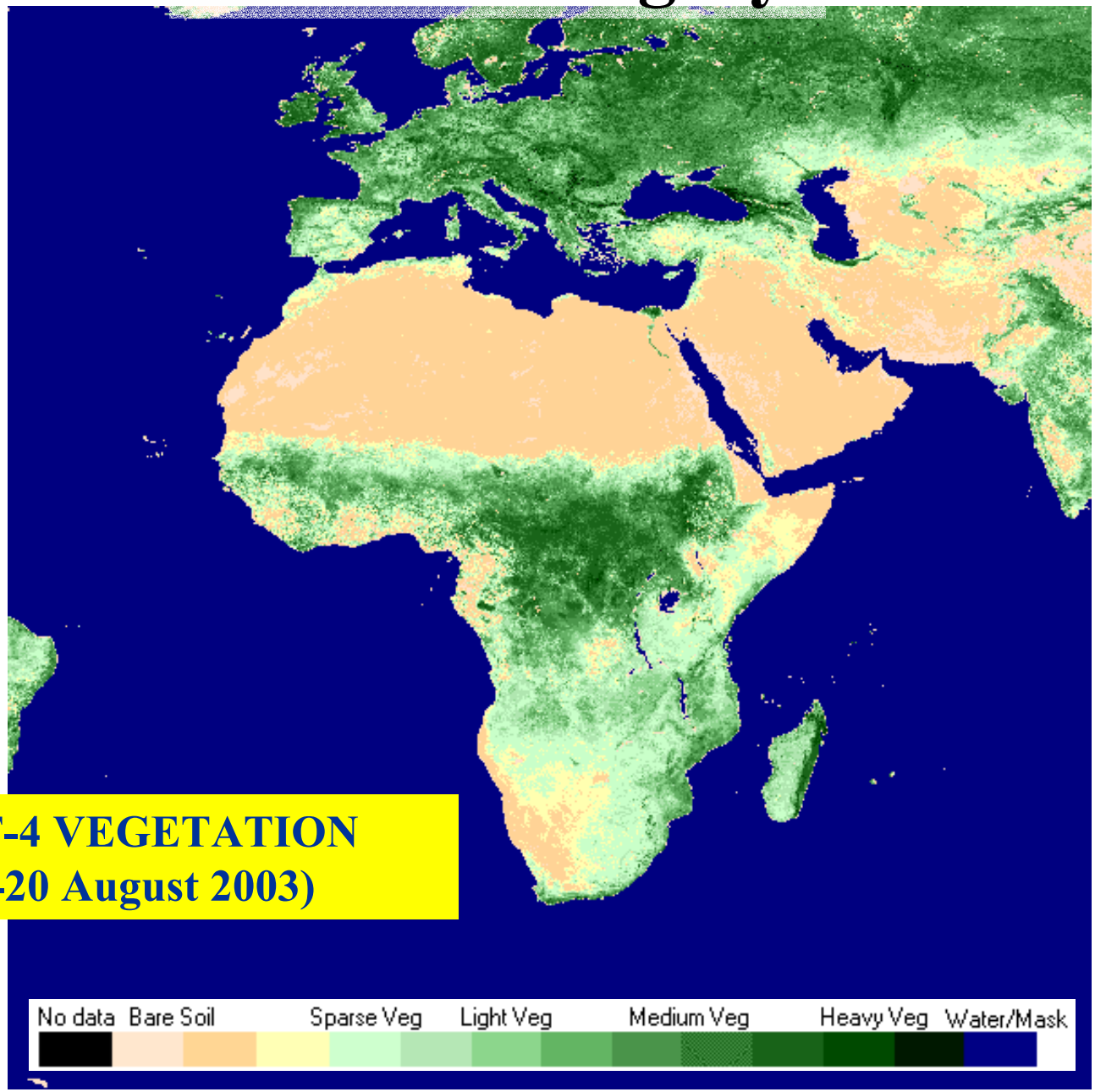


Satellite imagery

Real-Time Satellite Data Coverage



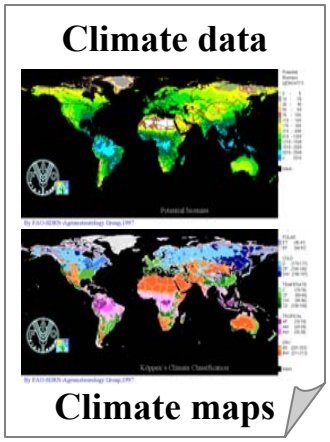
Satellite imagery



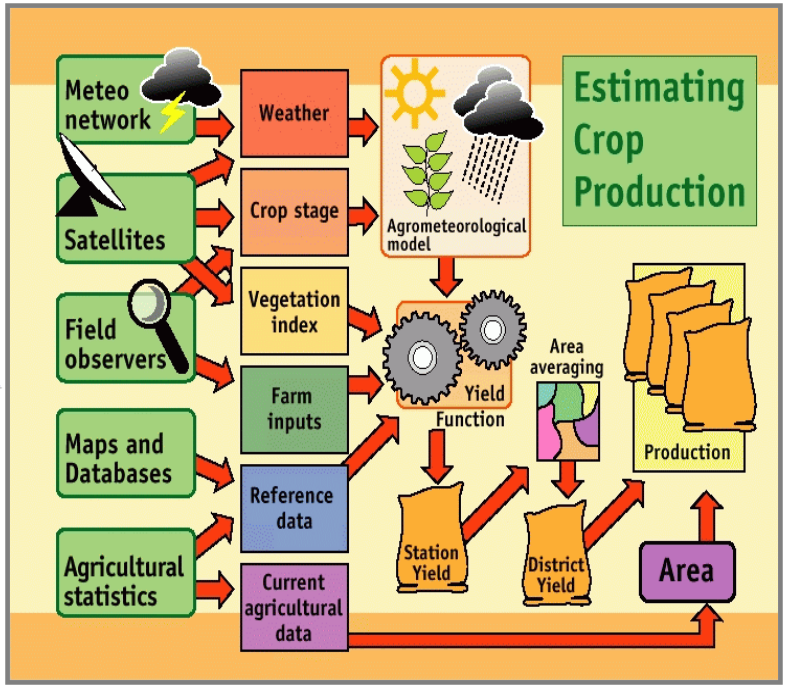
SPOT-4 VEGETATION
(11-20 August 2003)

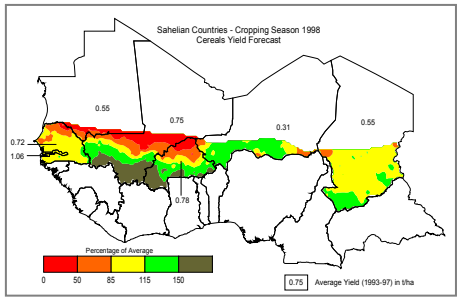
Agro-meteorology Group

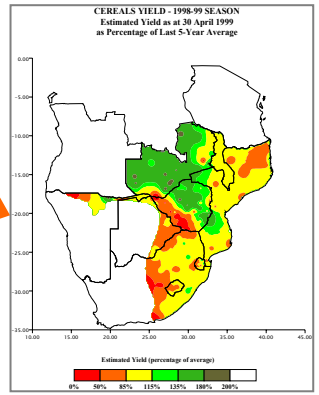
Depending on the country, up to 70% of the yield can be lost due to poor weather!

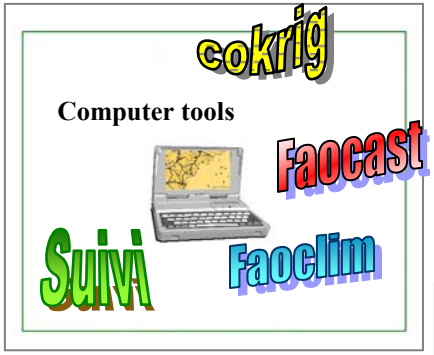


Weather impact can be quantified with the use of crop-weather models





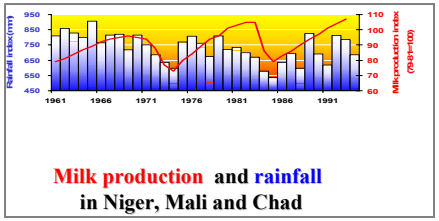




How much will you harvest?

Agro-meteorology can tell you!

Weather is the main single factor responsible for the year-to-year variations in crop yield.



Milk production and rainfall in Niger, Mali and Chad

FAO agro-meteorologists closely monitor crop conditions in Africa and extreme phenomena, such as El Niño. Crop-weather models are also used for the assessment of environmental risk and climate change impact.

Agro-meteorology Group

Main activities

➲ **Agro-climatic databases**: (i) collection of world-wide monthly time series and normals for about 25000 stations; (ii) dissemination of a database of African sub-national crop statistics; (iii) reference unit on climate, and climate change and agriculture.

➲ **Development and standardization of tools and methods of agro-climatic databases and application software:** it includes spatial interpolation of climatic variables, impact assessments and agroclimatic risk.

➲ **Crop monitoring ad yield forecasting:** based on rainfall reports from FAO country representatives, GTS data, satellite imagery and crop specific water balance model. The outputs are provided to the Global Information and Early Warning System (GIEWS).

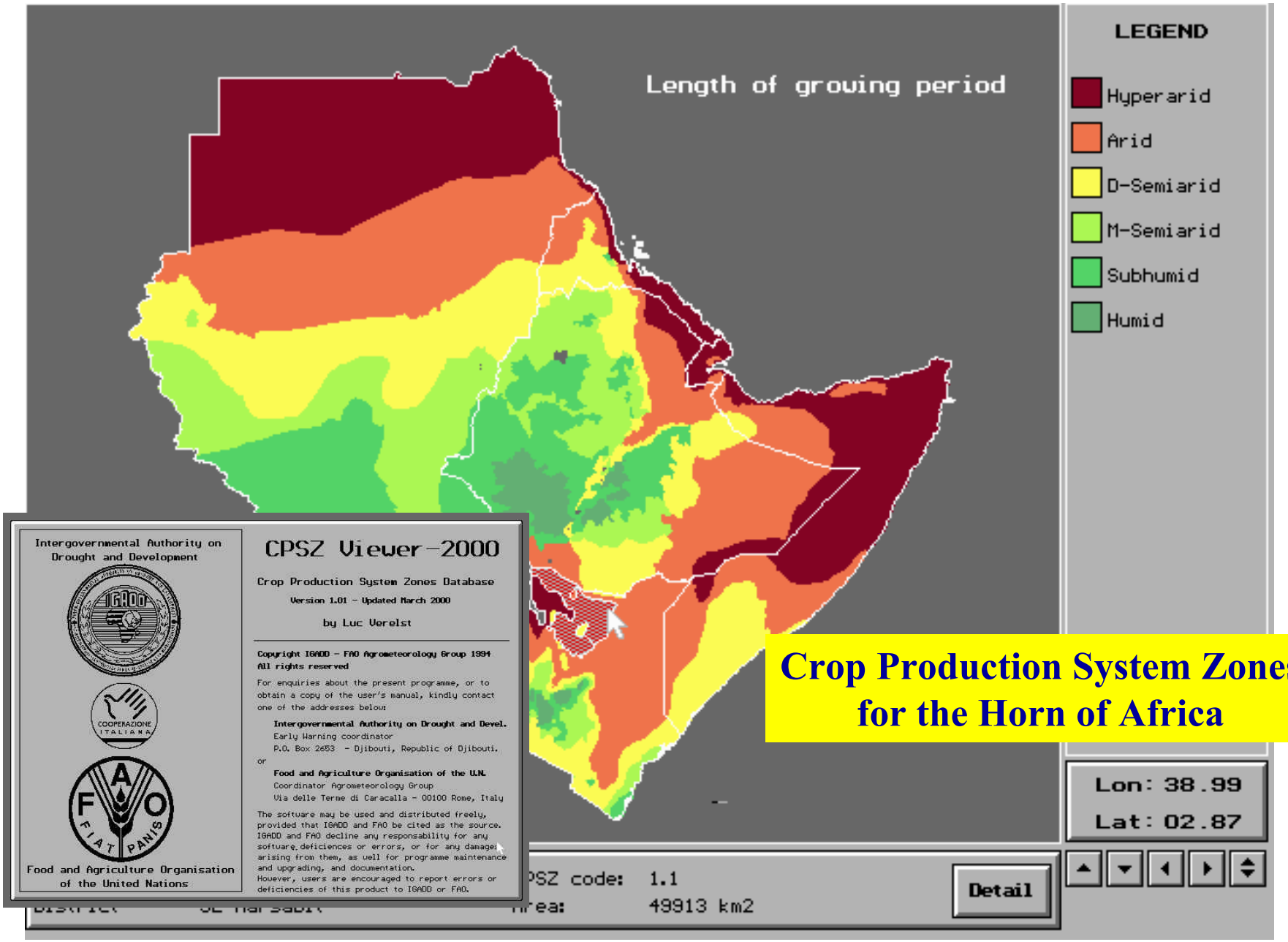
Agro-meteorology Group

Main activities

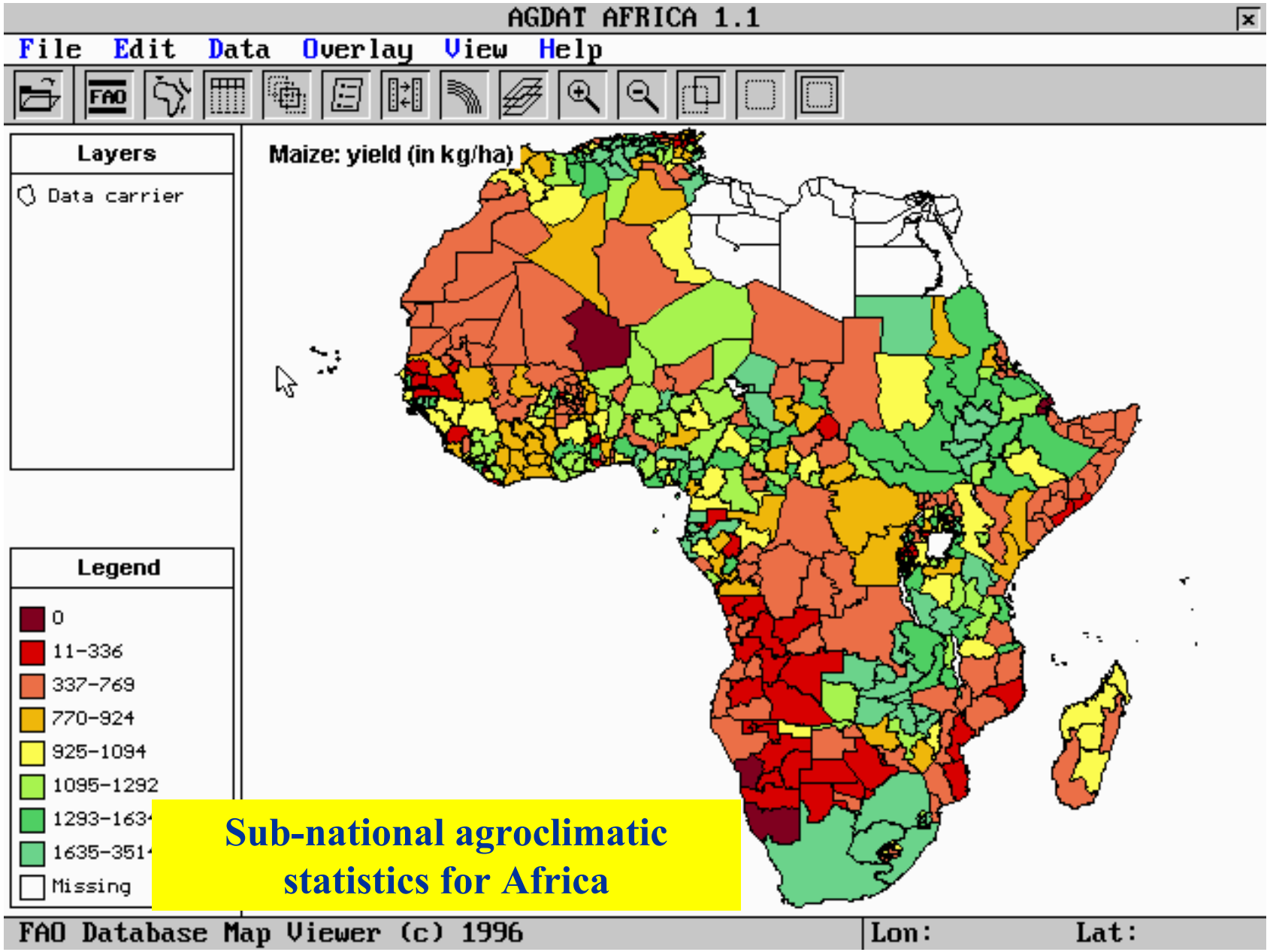
➲ **Climate-related risk in agriculture:** analysis of climate risk and vulnerability applied to agricultural production and attempts to quantify, at a national and global scale, the losses actually suffered by agriculture due to climate variability.

➲ **Disaster Impact Assessment:** evaluation of methodologies for rapid evaluation of geophysical disaster impact as related to the agricultural sector, and development of a detailed disaster impact database as a tool for impact simulation.

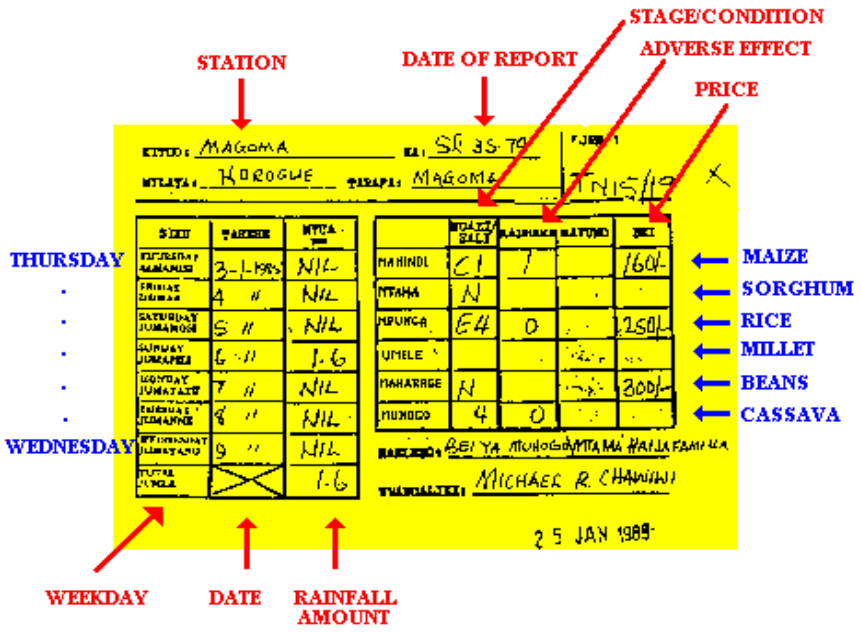
Agro-climatic database



Agro-climatic database



Crop monitoring and yield forecasting



République du Niger
Direction de la Météorologie Nationale BP 218 Niamey
Pluviométrie décadaire, cumulée de la saison en cours à la : Troisième décade de Juin 2002
et comparaison par rapport à l'année passée (2001)
et à la normale établie sur la période 1971-2000

Nom	Somd	Soms	Esap	Enc
TILLIA.PA	7.1	27.4	-1.2	-
KEITA	17.6	49.1	-74.5	-19.7
ABALAK	0.0	15.4	-11.4	-20.3
TASSARA	0.4	28.2	-4.5	-
AZERORI	14.0	79.0	48.5	-
BADEGUICHIRI	53.5	93.0	2.1	13.9
BAGAROUA.PA	11.2	21.8	-74.4	-
BAMBEYE	0.0	16.2	-8.7	-
DOGUERAOUA	0.0	80.9	-28.9	-
GALMI	1.6	55.2	-21.2	-
GUIDAN IDDER	0.0	55.0	-2.1	-
IBECETANE	4.0	57.9	21.9	-
KALFOU	38.3	-	-	-
KAO	2.9	-	-	-
MAGARIA (MADAOUA)	0.0	60.0	-0.6	-
MALBAZA	32.9	106.9	55.3	14.0
MANZOU (MADAOUA)	16.2	-	-	-
TAMASKE		34.2	-53.8	-36.6
		-	-	-
		10.5	-11.3	-
		51.5	-	-
		151.6	80.8	-
		67.6	1.9	-
		64.3	-34.8	-
		30.3	-46.9	-47.5
		45.6	-19.0	-11.7
		8.8	-19.5	-33.0
		84.2	0.3	18.3
		33.2	-40.0	-54.0
		23.0	-72.2	-
		48.4	-41.5	-
		48.5	-35.2	-21.0
		10.7	-32.0	-41.9
		9.4	-62.7	-
		7.5	-45.9	-61.0
				-
				-
				-47.8

Régions	Nbre de villages agricoles	Semis décade précédente (2e d-06-02)	Villages ayant semé (3e décade de juin)					
			2 002		2 001		ECART	
			Nombre	Taux	Nombre	Taux	Nombre	Taux
AGADEZ	217	0	0	0	0	0	0	0
DIFFA	559	37	37	7	388	69	-319	-62
DOSSO	1 376	1 218	1 331	97	1 257	91	+74	+6
MARADI	2 183	1 491	1 569	72	1 459	67	+110	+5
TAHOUA	1 380	889	1 129	82	1 214	88	-85	-6
TILLABERY	1 658	1 290	1 327	80	1 495	90	-168	-10
ZINDER	2 685	587	967	36	1 785	66	-818	-30
C.U.N.	26	26	26	100	26	1(		
TOTAL NIGER	10 084	5 538	6 386	63	7 603	7		

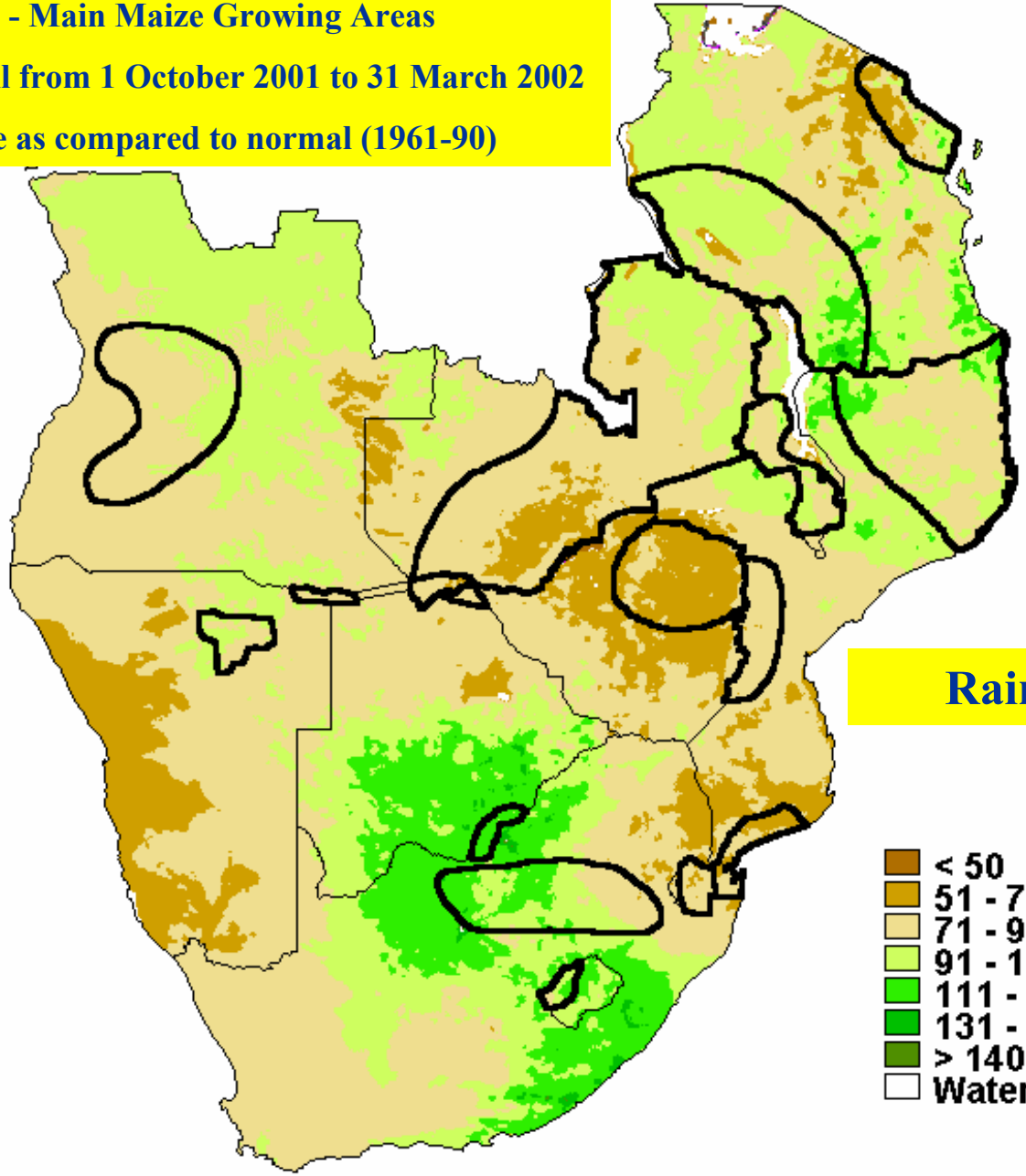
Field reports

Crop monitoring and yield forecasting

SADC - Main Maize Growing Areas

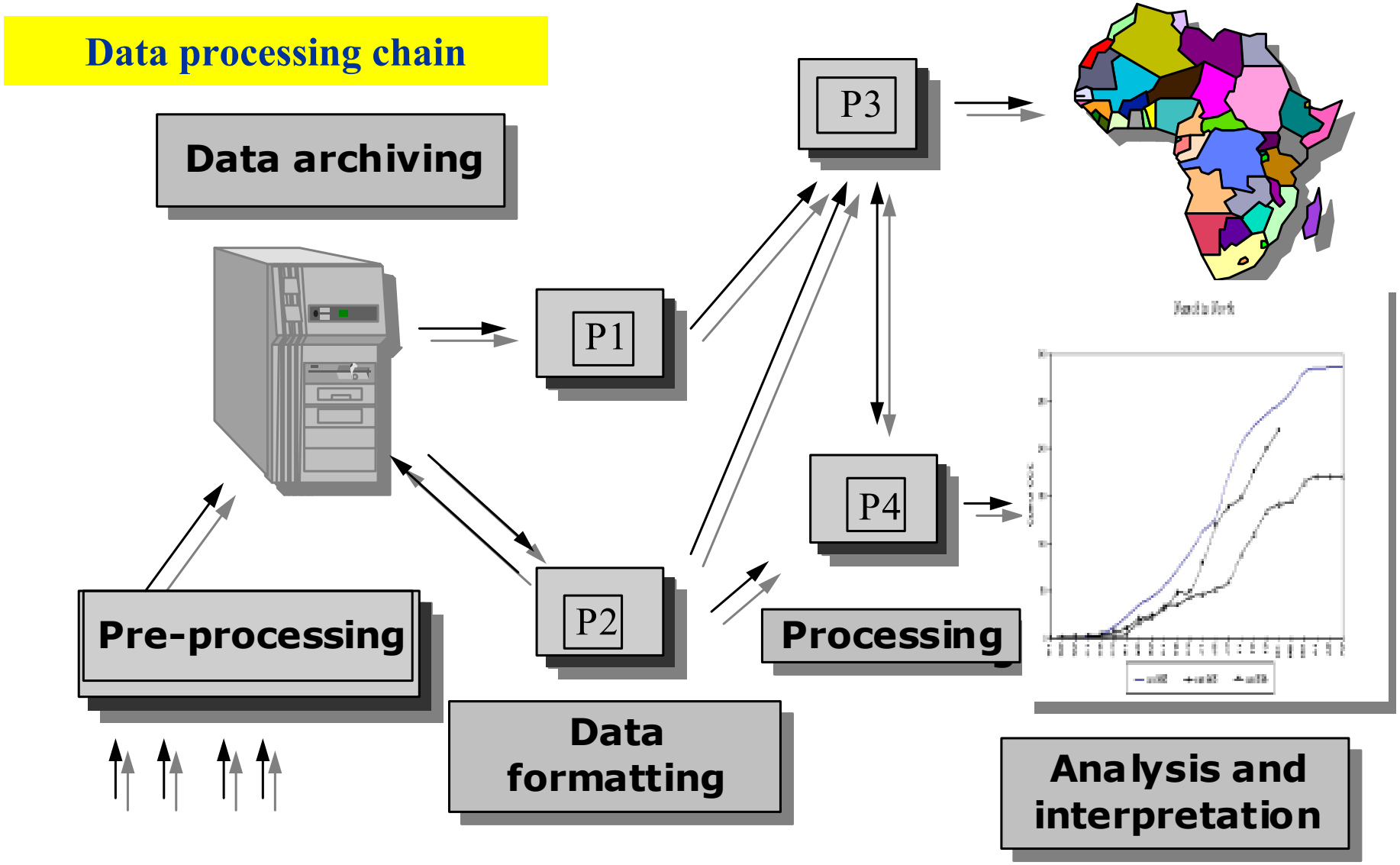
Seasonal Rainfall from 1 October 2001 to 31 March 2002

Percentage as compared to normal (1961-90)

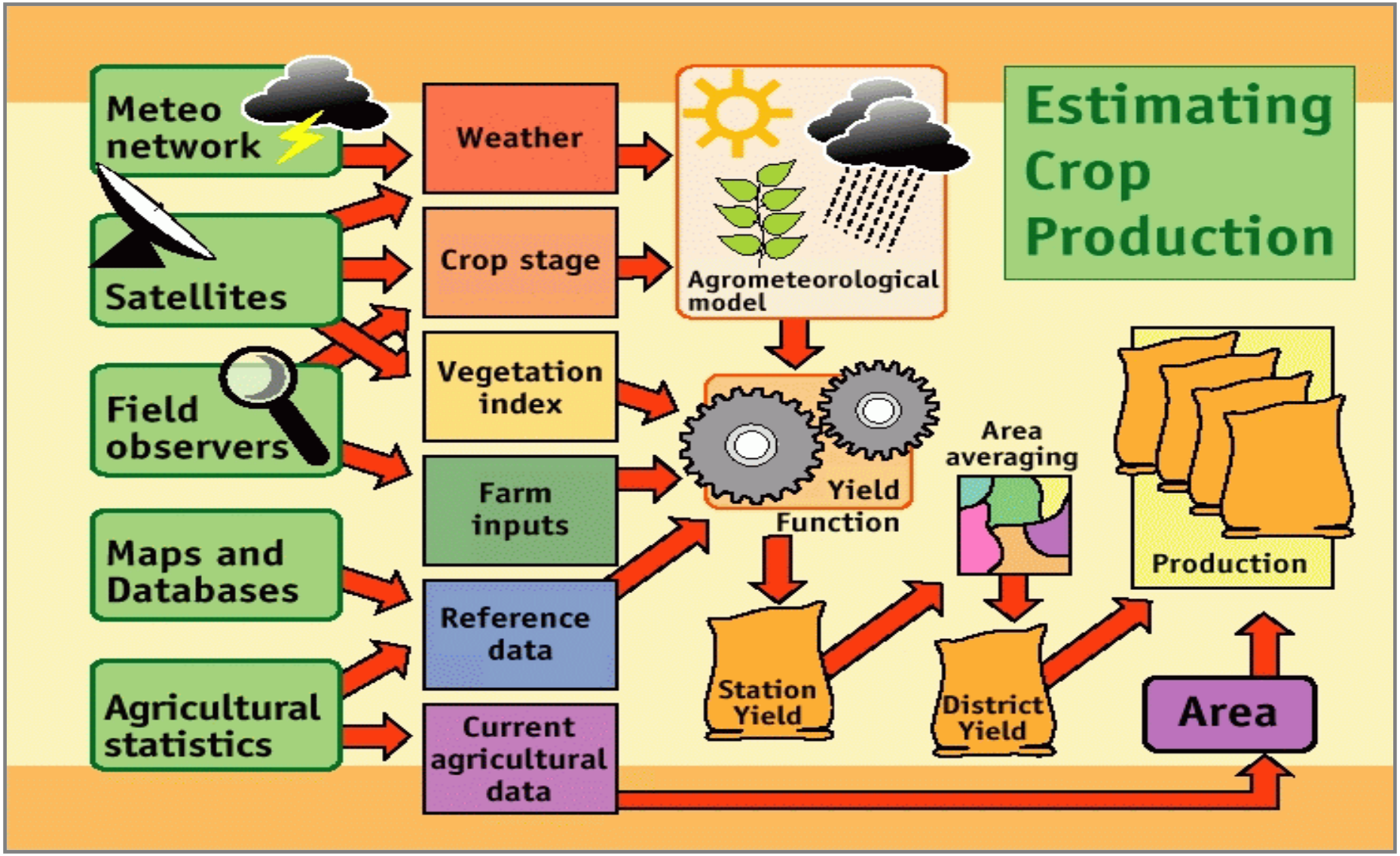


Rainfall monitoring

Crop monitoring and yield forecasting

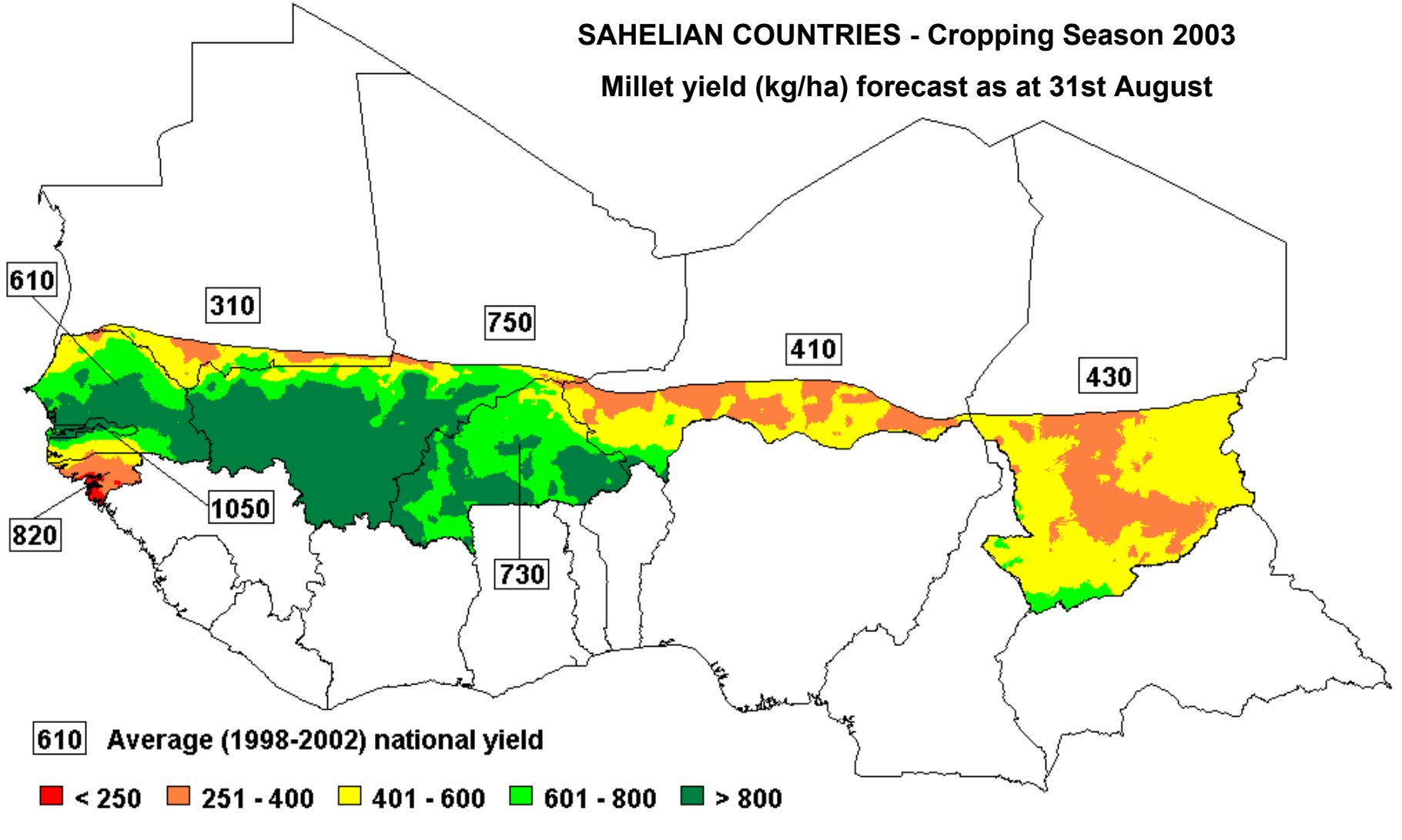


Crop monitoring and yield forecasting

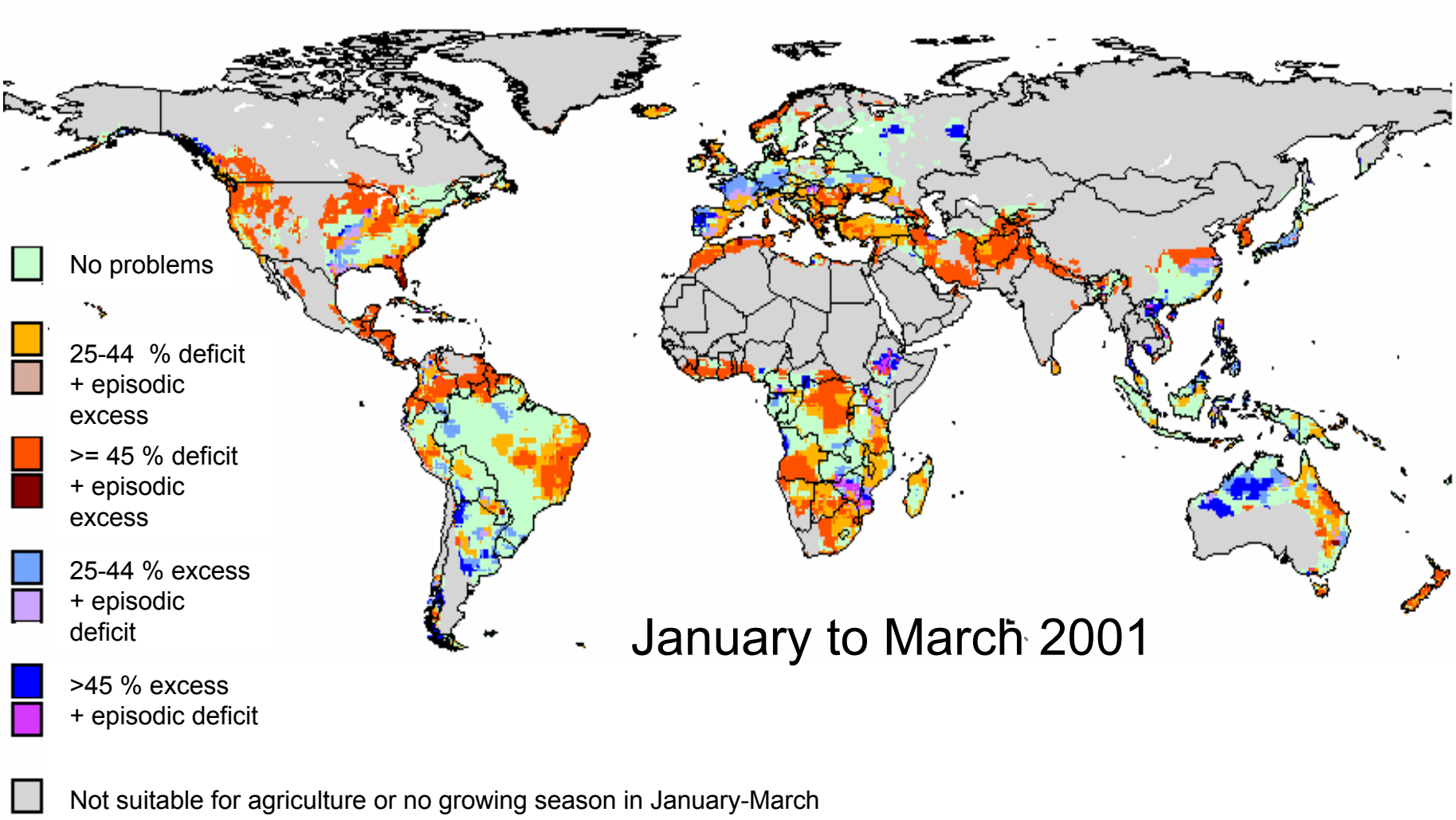


Crop monitoring and yield forecasting

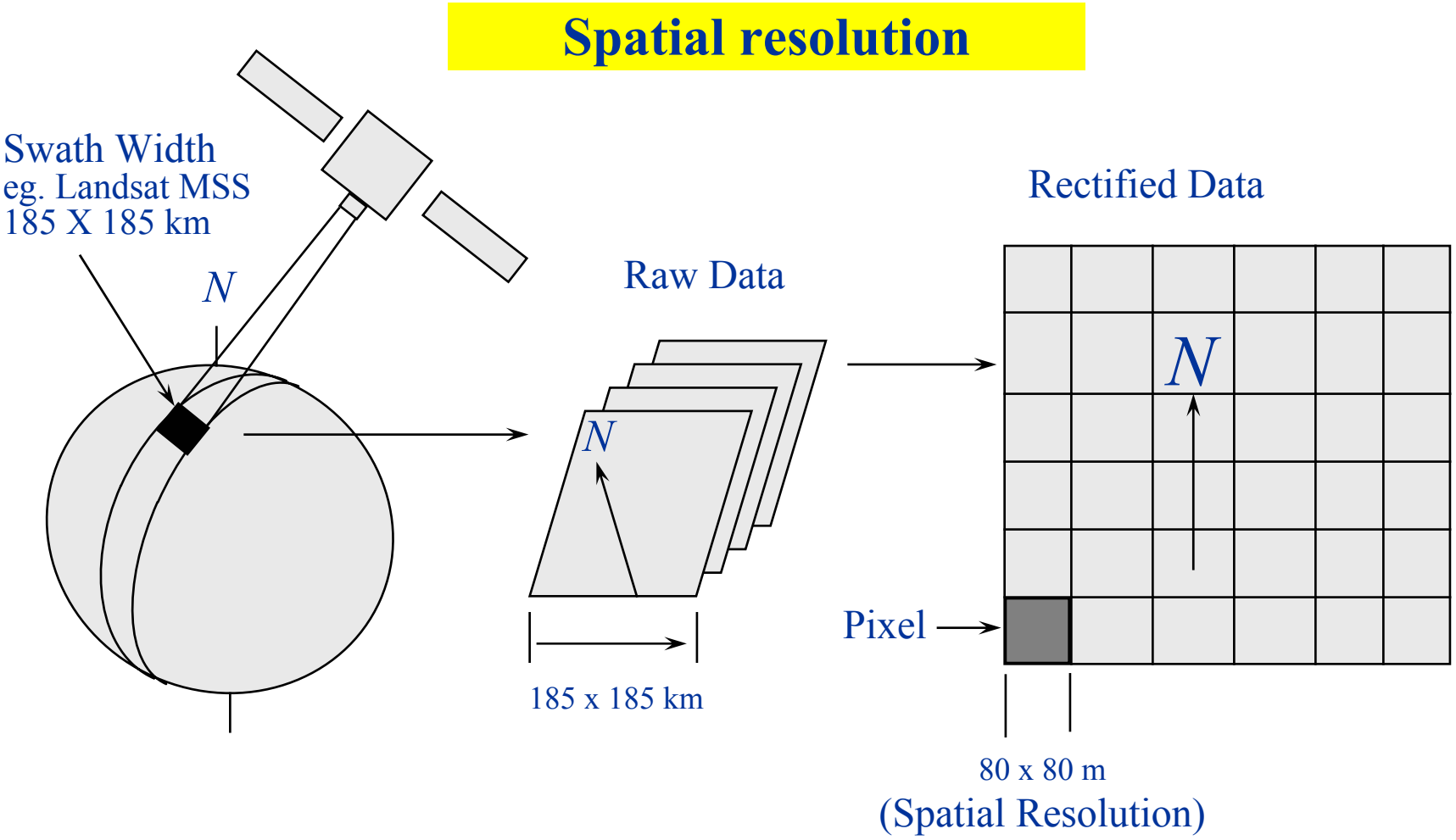
Crop yield forecast in Sahel



Global Water Stress Map

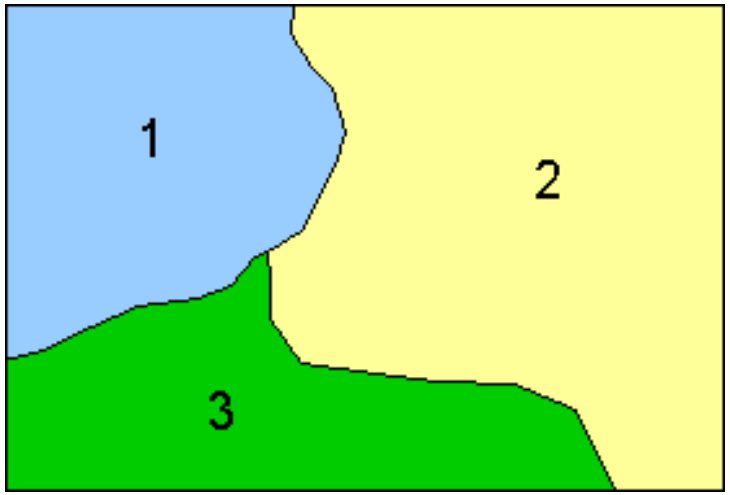


Geo-referenced datasets

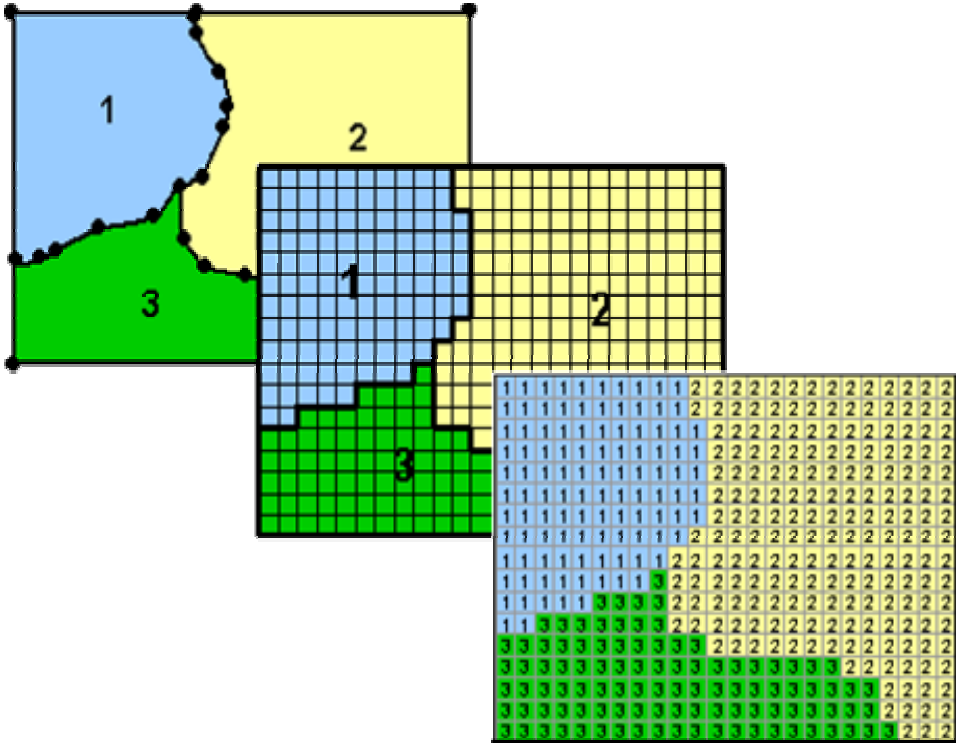


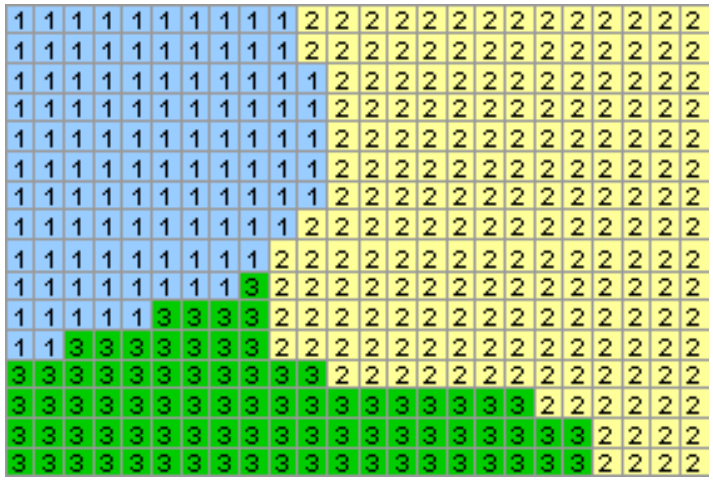
Geo-referenced datasets

Vector-base geo-referenced data



From vector to raster

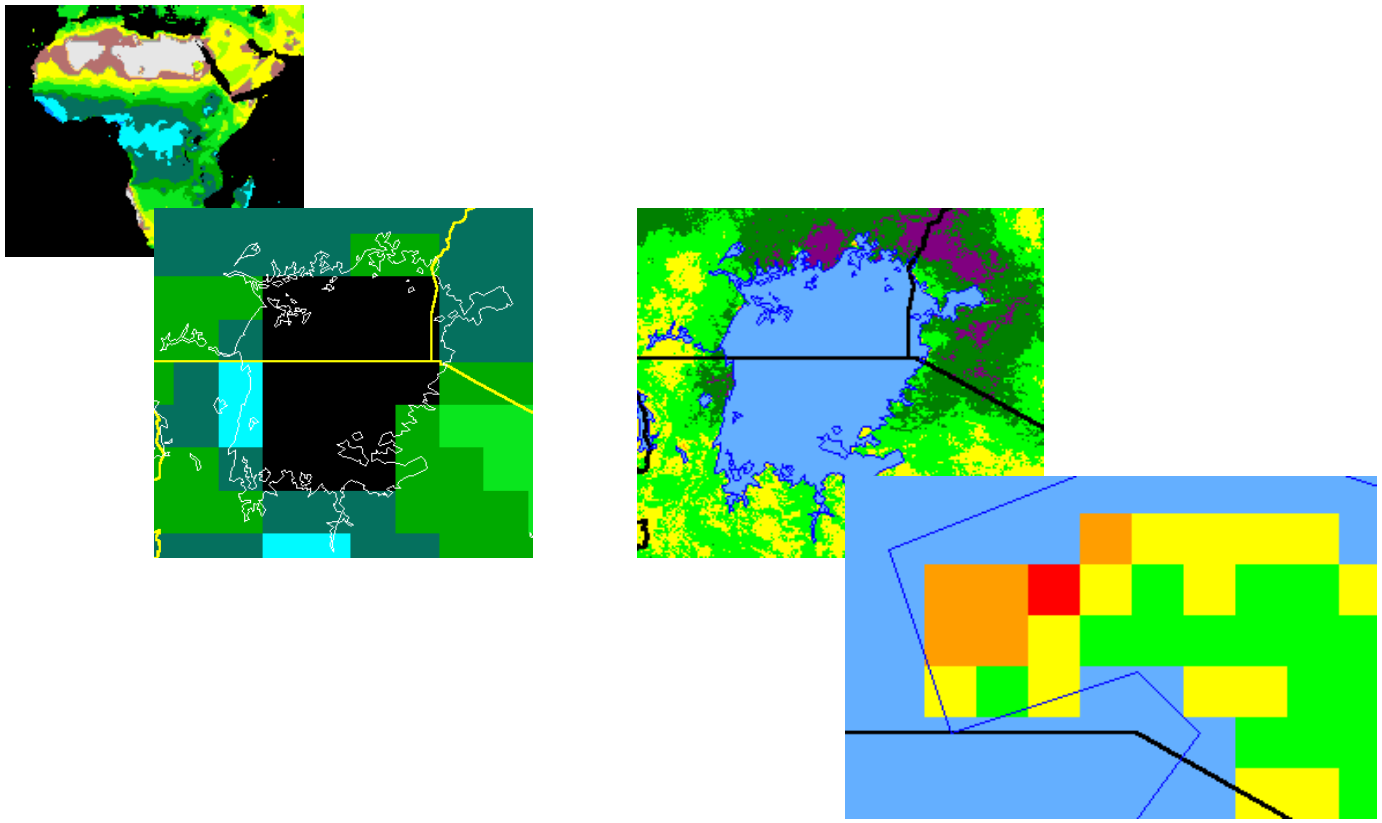




Raster-base geo-referenced data

Geo-referenced datasets

Scaling down: increasing spatial resolution

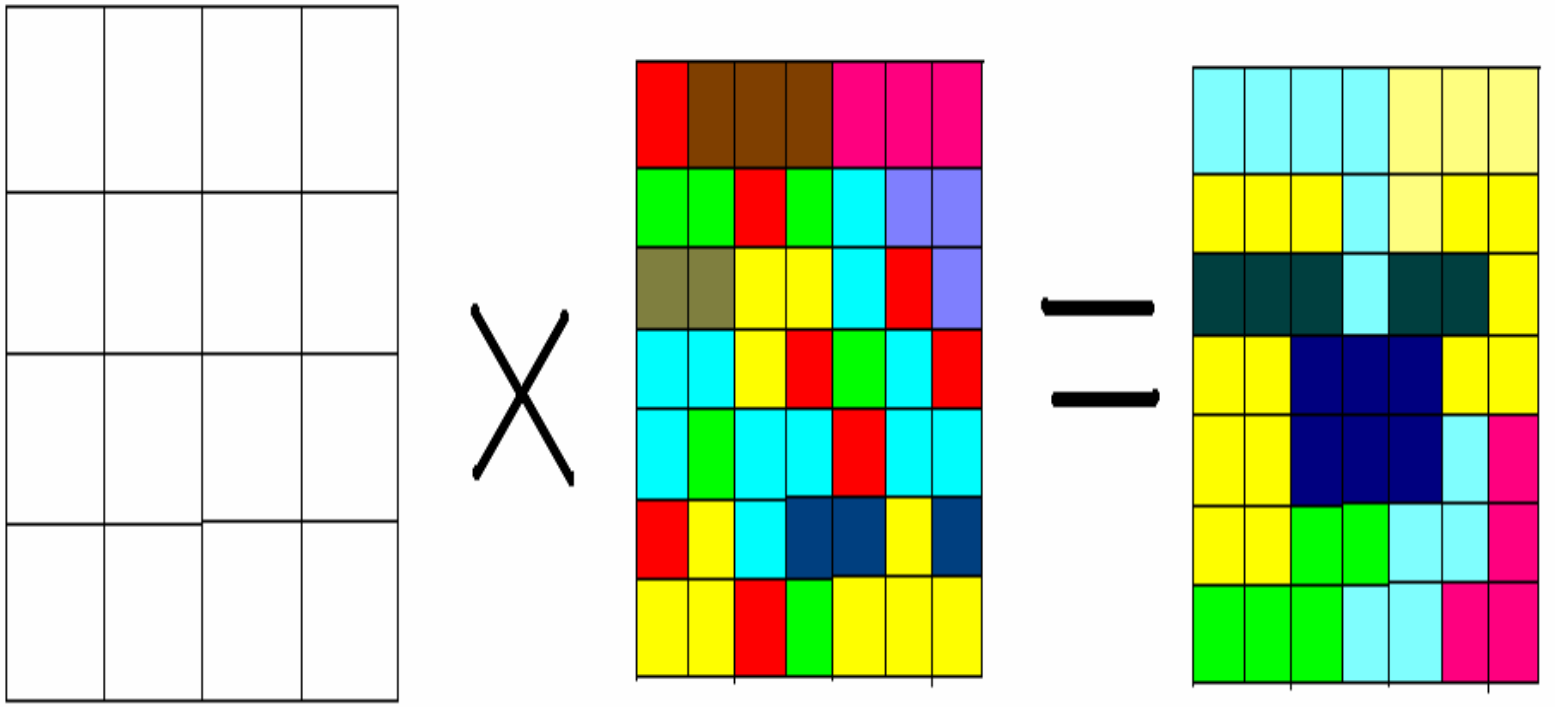


Geo-referenced datasets

Satellite Enhanced Data Interpolation (SEDI)

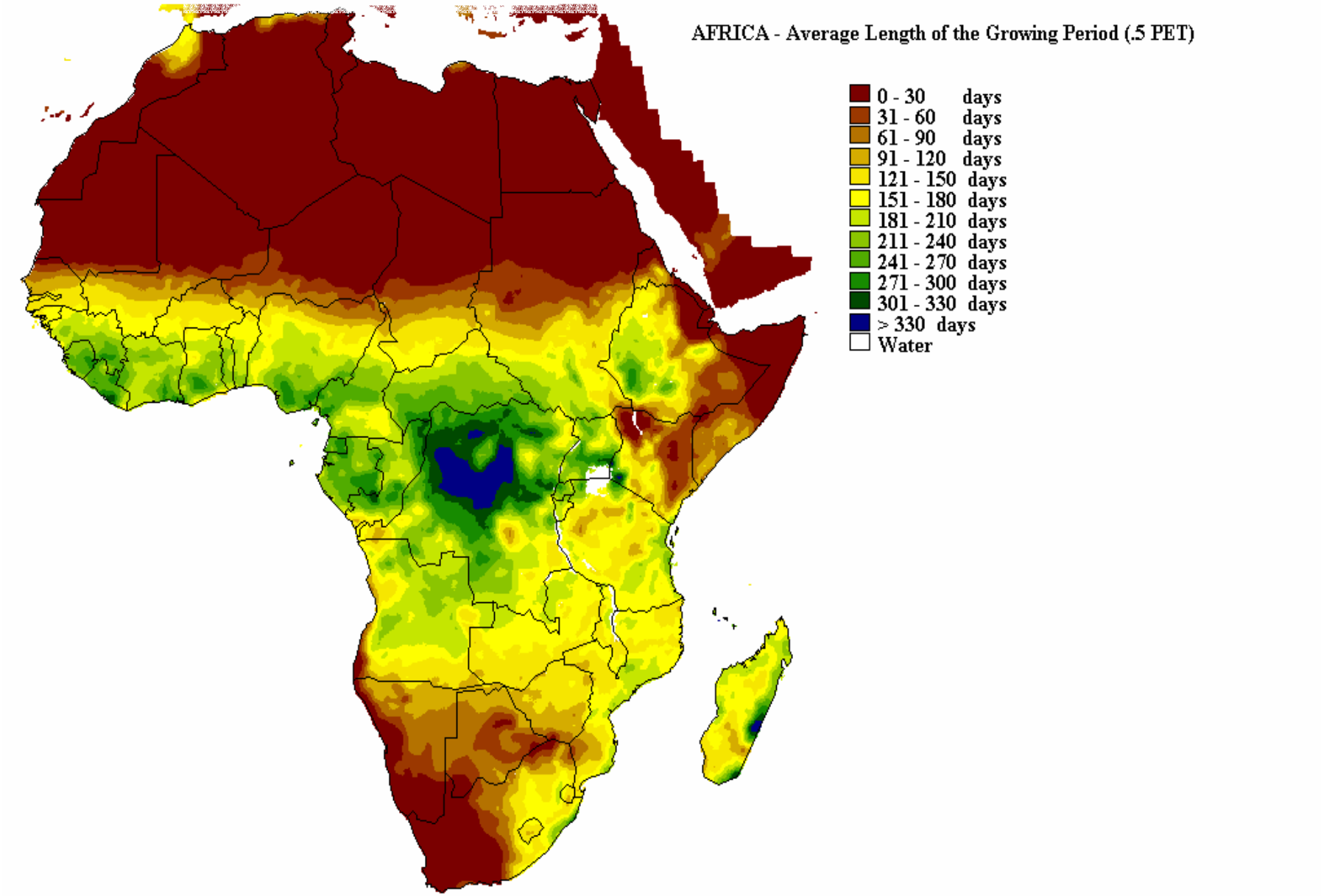
- Module for AgroMetShell and WinDisp
- Combination of any point data with correlated background "surface"
- Error estimate

Geo-referenced datasets

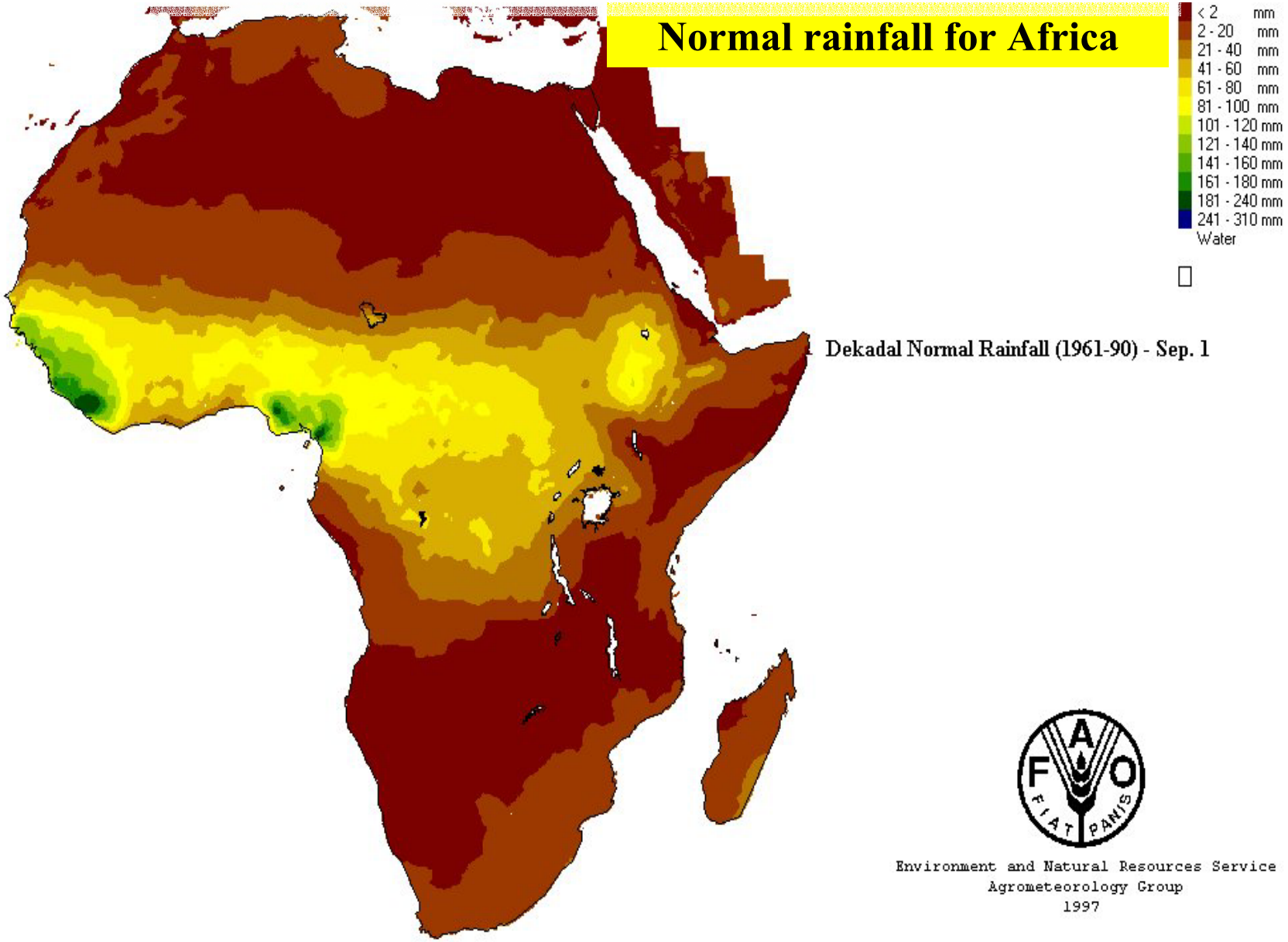


Creating the Satellite Enhanced Data Interpolation
SEDI image from ratio grid and background image

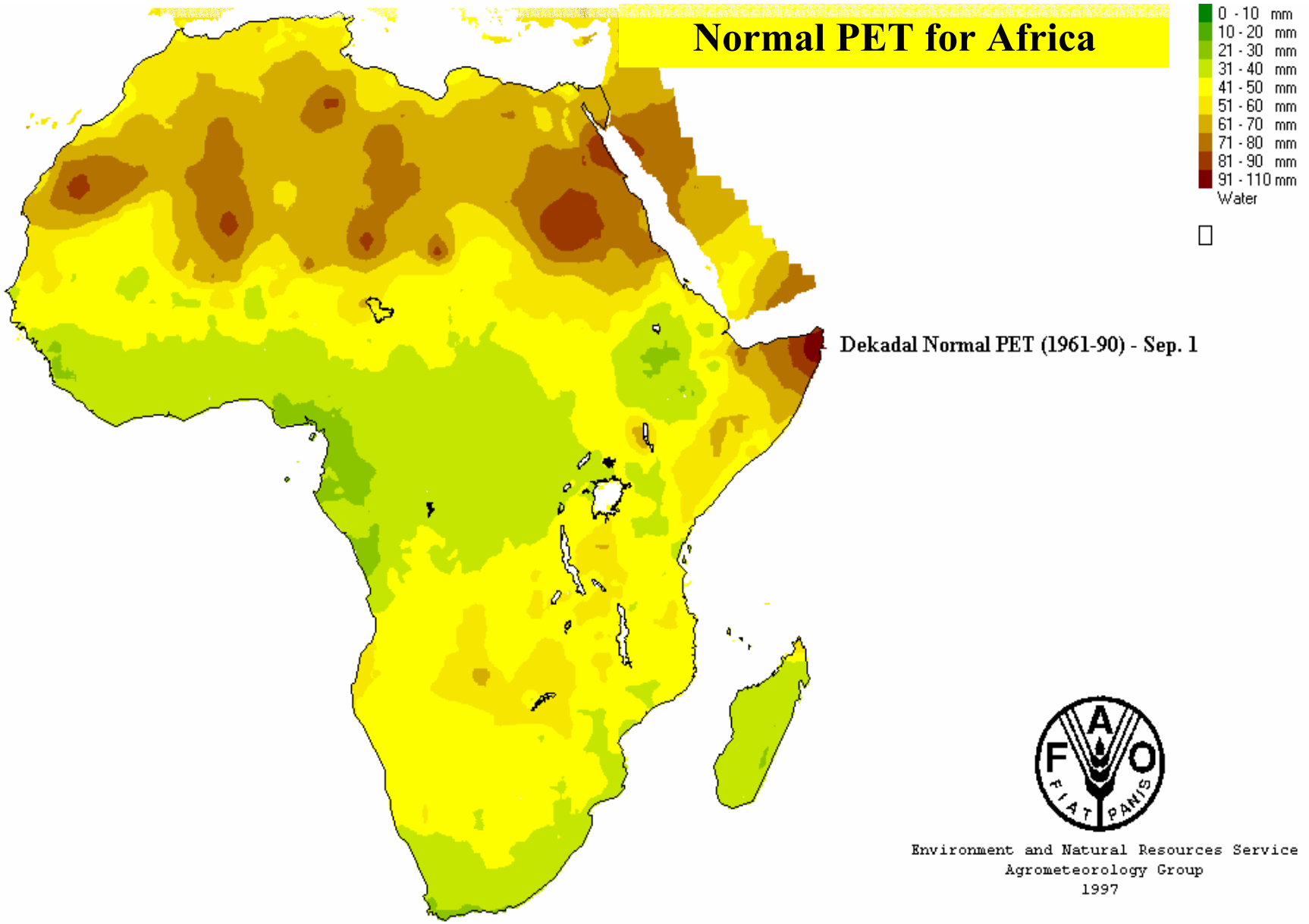
Geo-referenced datasets



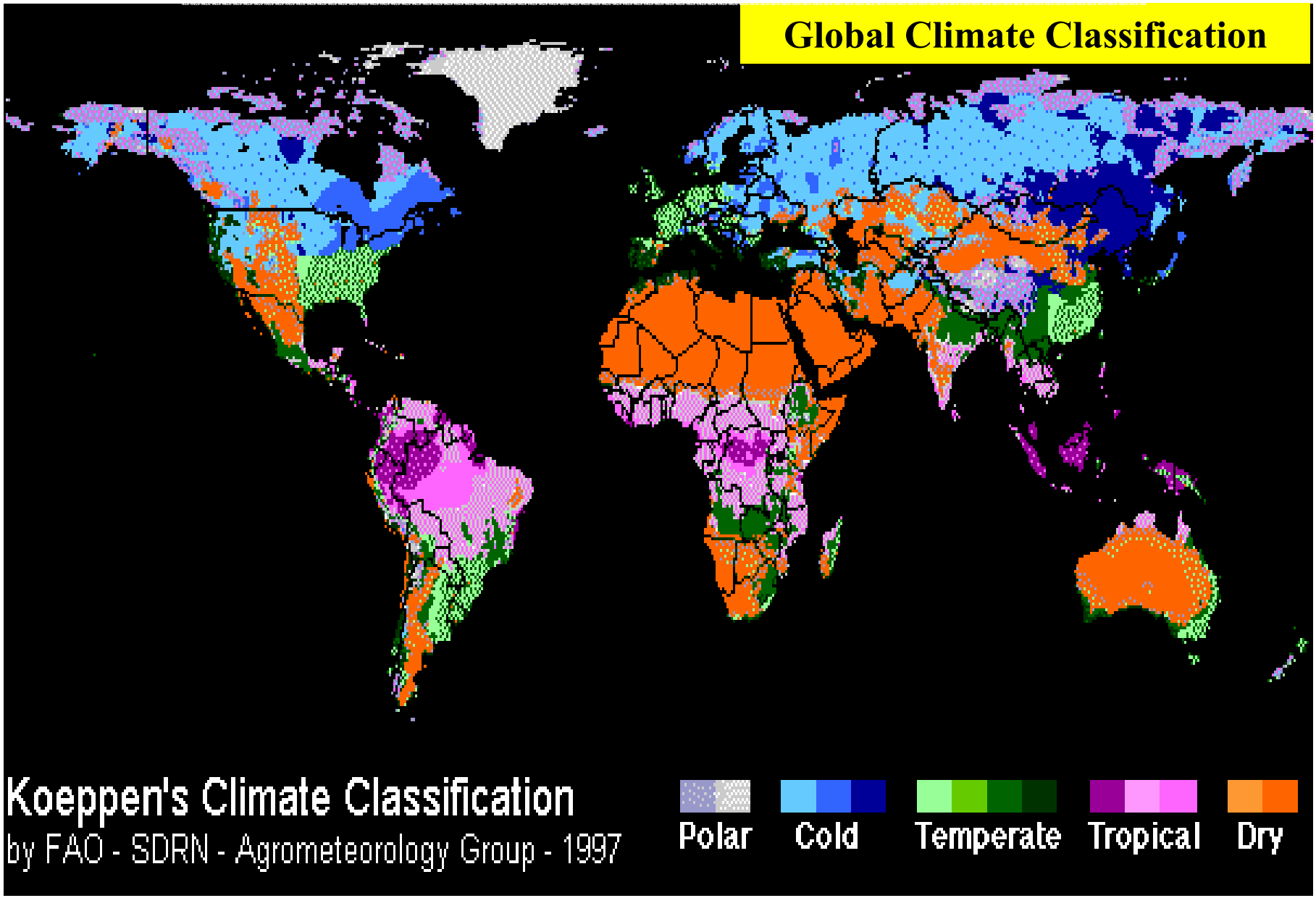
Geo-referenced datasets



Geo-referenced datasets

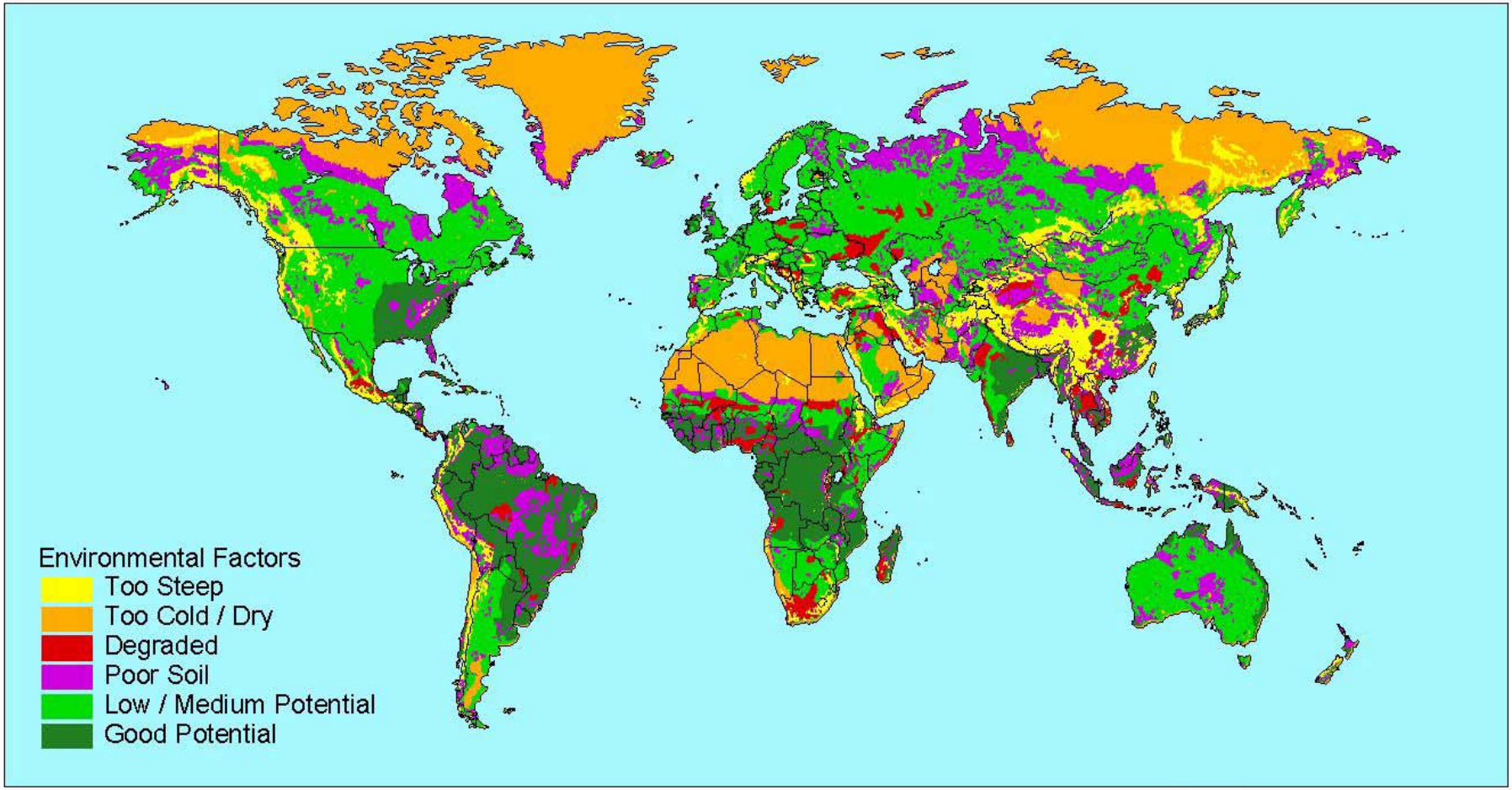


Geo-referenced datasets

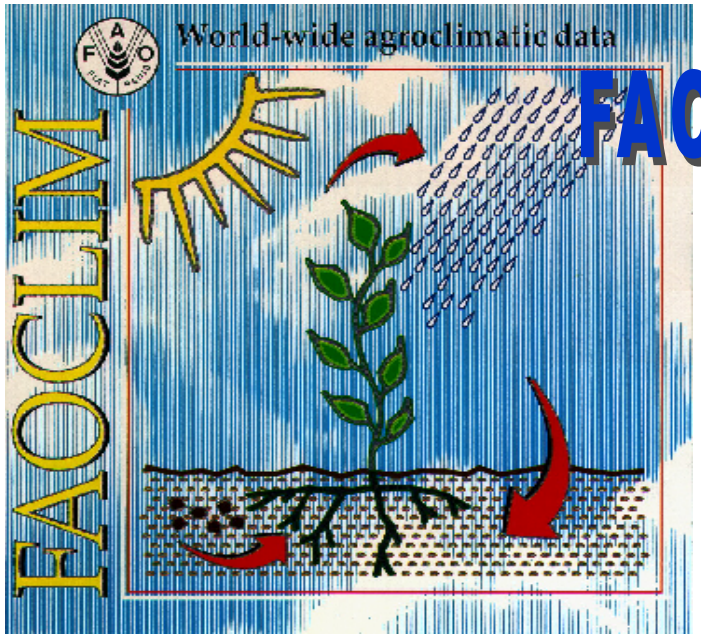


Geo-referenced datasets

Major Global Environmental Potential and Constraints For Agricultural Production



Agro-meteorological software development

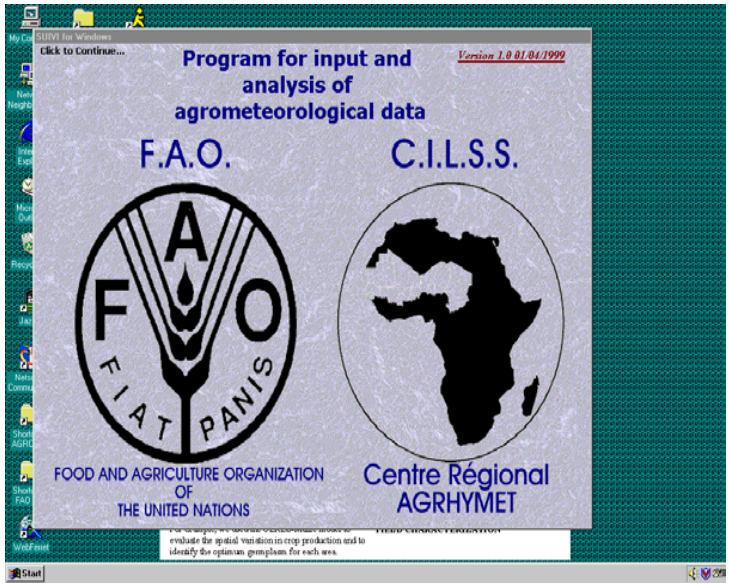


FAOCLIM

FAOINDEX

FAOUTILS

FAOMET



SUIVI

COKRIG

Agro-meteorological software development

Technical options

- Agro-meteorological and remotely-sensed data are integrated at all levels whenever possible: at the level of data (rainfall, phenology) and at the level of products (area averaging of yields)

- Gridding is done after modelling, under the assumption that there exist variables, such as NDVI, which are at least qualitatively linked to crop condition in a given area. If this assumption does not hold in quantitative terms over large areas is not relevant for the interpolation procedures adopted. This also assumes that such factors as soil fertility and the effect of greater soil holding capacity is captured by NDVI.

- The time step mostly adopted is the dekad.

Agro-meteorological software development

Technical options

- Results are calibrated against agricultural statistics through empirical yield functions. It is clear that the accuracy of the forecasts cannot possibly be better than the agricultural statistics used to calibrate them. There is thus some uncertainty about the precision, 10% to 30% is probably a good guess. At the scale at which we work, e.g. districts, provinces, etc., models developed at the field level do not apply.

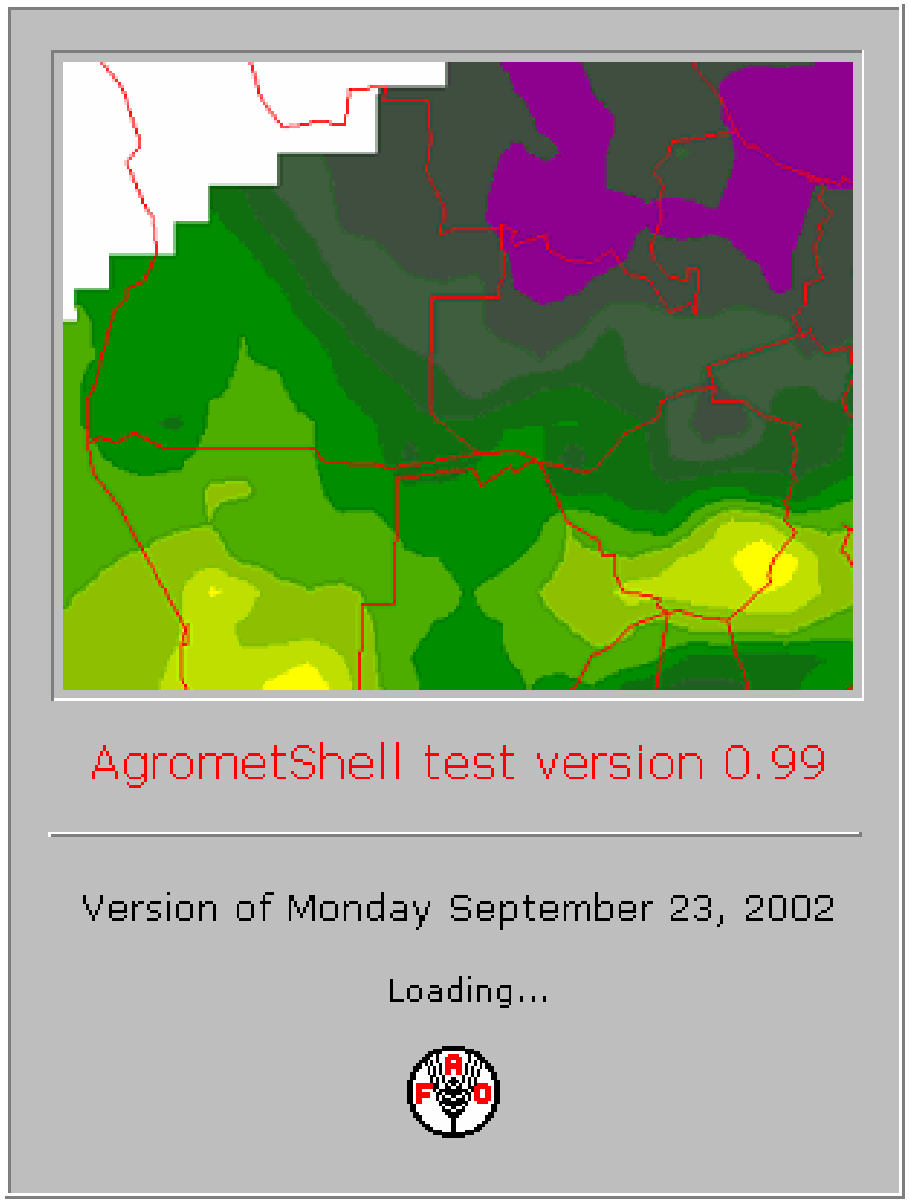
- The “agro-meteorological model” under the flowchart is thus usually very simple. It aims more at assessing growing conditions through value-added “water balance parameters” then actually simulating crop-weather-soil interactions. It is, therefore, justified to use empirical yield functions which, in addition, avoid to touch on the most difficult issue of geographic scale effects.

Agro-meteorological software development

Technical options

- Tools are modular, i.e. the crop forecasting system uses a number of software tools that carry the analysis from the data to the final production estimate. Any specific tools can be changed without touching the whole structure of the system: the system remains light and easily up-gradable and maintainable. This is facilitated by standardisation through common file names and structure.

FAO Agro-meteorological toolbox



AgroMetShell

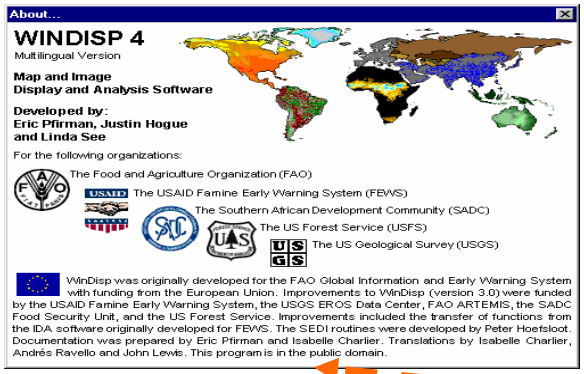
FAO Agro-meteorological toolbox

- **Free-ware software**
- **Modularity**
- **Standard file formats**
- **Training support**
- **Technical support**
- **Long-term sustainability**

FAO Agro-meteorological toolbox

Import-Export links of AMS toolbox

WinDisp



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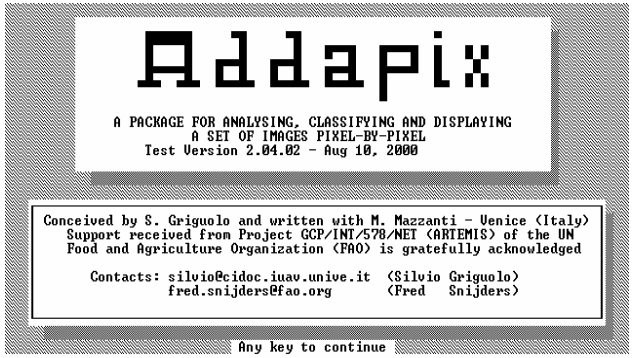

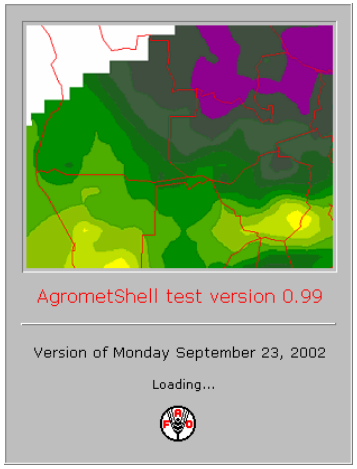

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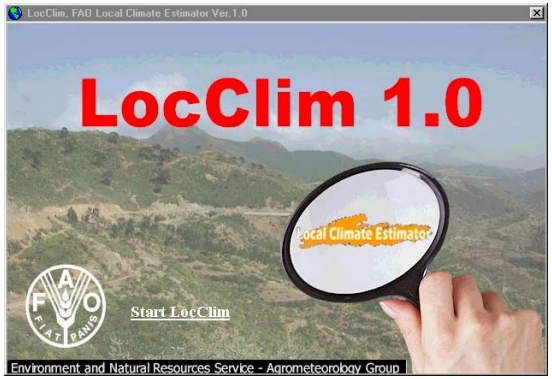
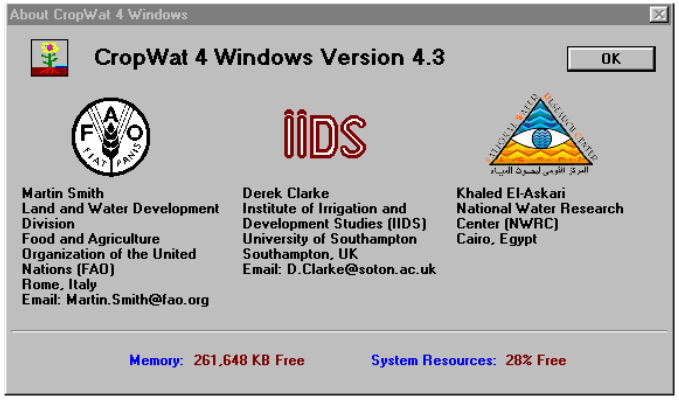


CropWat



FAO Agro-meteorological toolbox

Database

- By Country, by Station, by List
- Meteorological
- Climatic
- Agronomic
- Soil
- Import
- Export

Crop Specific Water Balance Model

- Maize
- Millet (bulrush)
- Tef
- Wheat
- Sorghum
- Finger Millet
- Flooded rice
- Upland rice
- ETP
- Any crop

Spatial Interpolation

- Inverse distance
- SEDI (inverse distance)
- SEDI (regression)
- Cokriging

Agromet Tools

- Solar radiation estimate
- Dekadal from monthly
- Day and night-time temperatures
- ET0
- LGP
- Potential yield
- Risk analysis

Statistical Tools

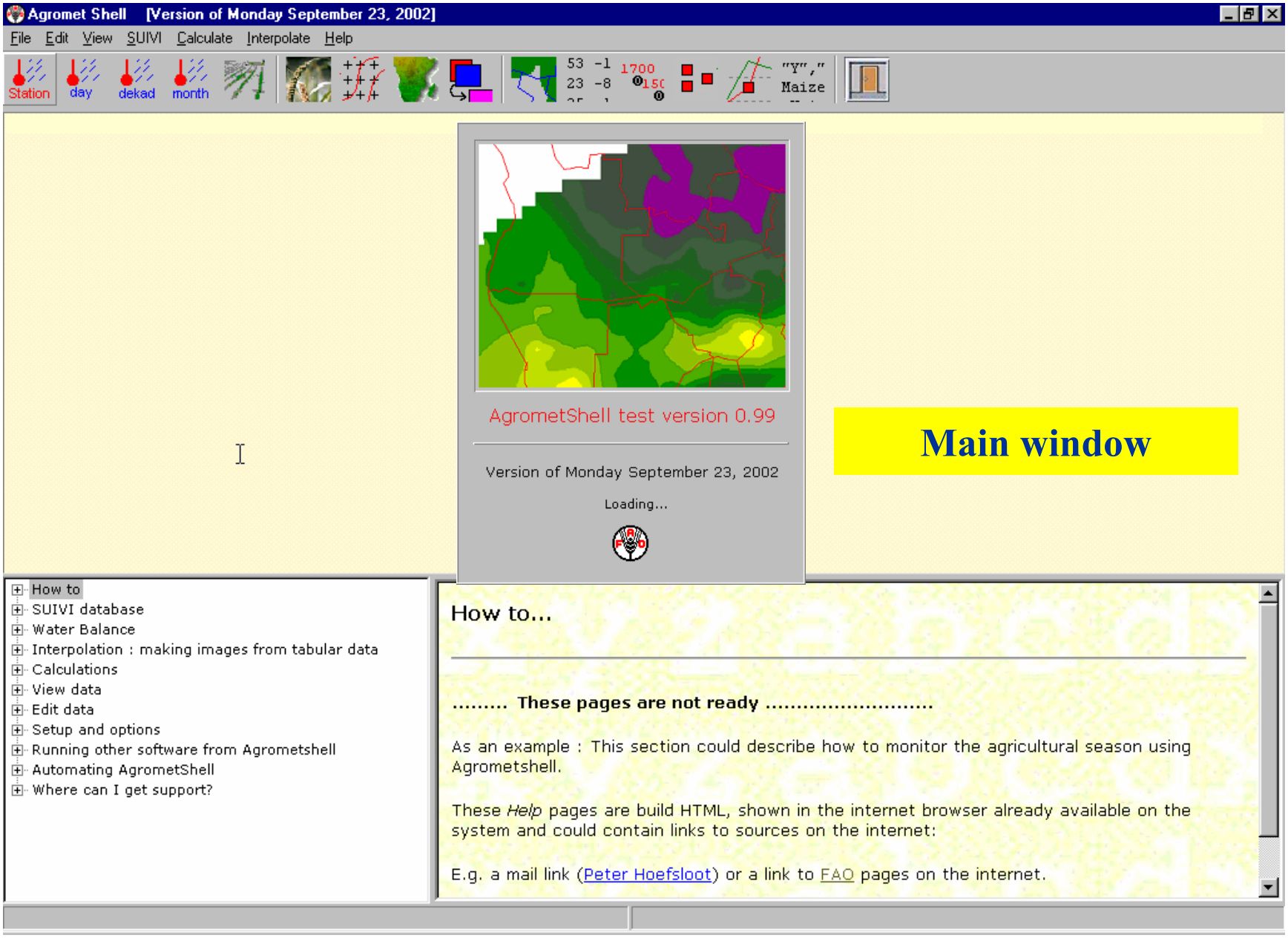
- Correlation
- Multiple regression
- PCA
- Trends
- Gamma distribution

Image Analysis

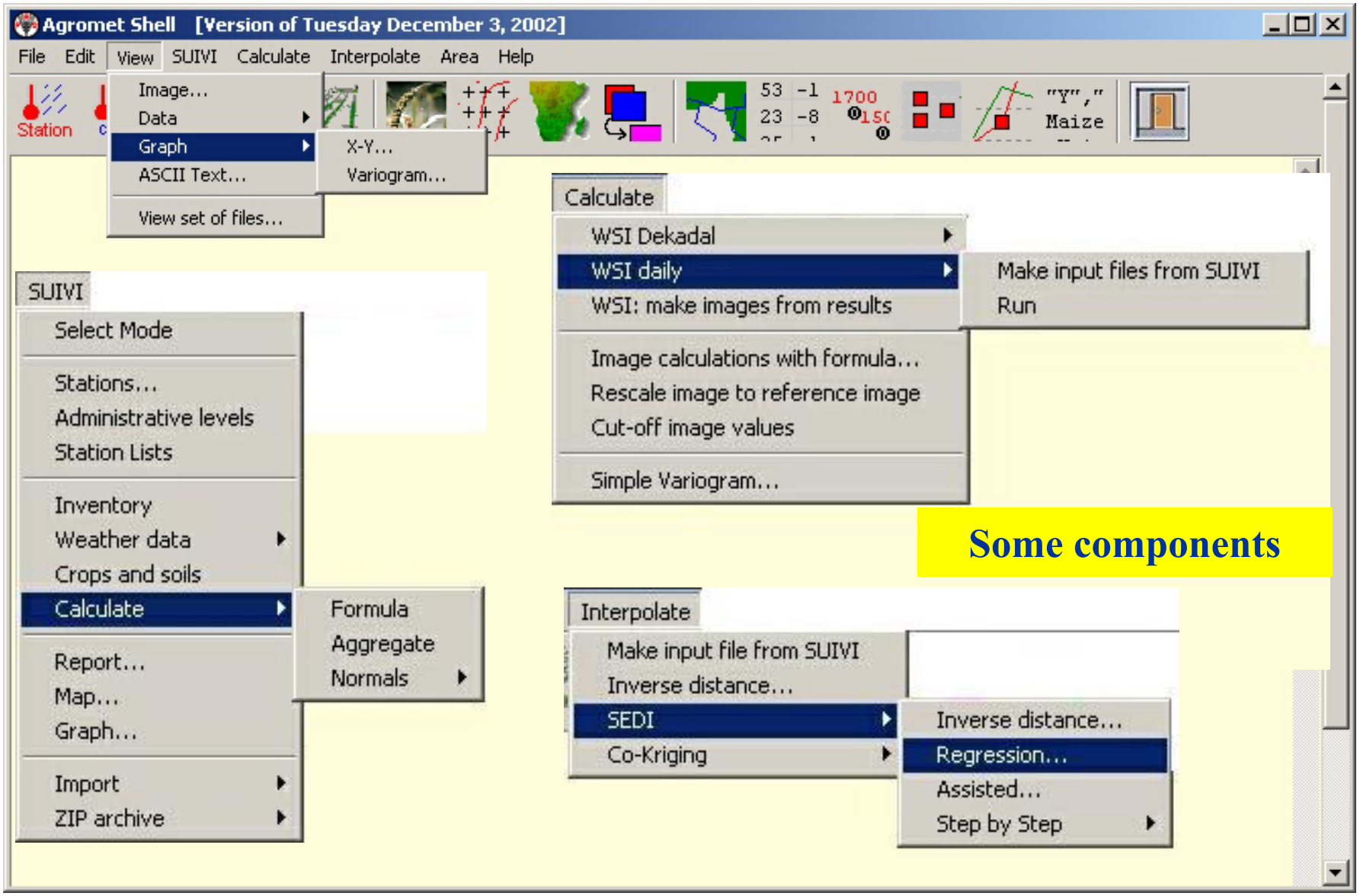
- Display
- Color table edit
- Image calculation with formula
- Cut-off image values
- Rescale image
- Simple variogram
- Create image from other outputs

Modules

FAO Agro-meteorological toolbox



FAO Agro-meteorological toolbox



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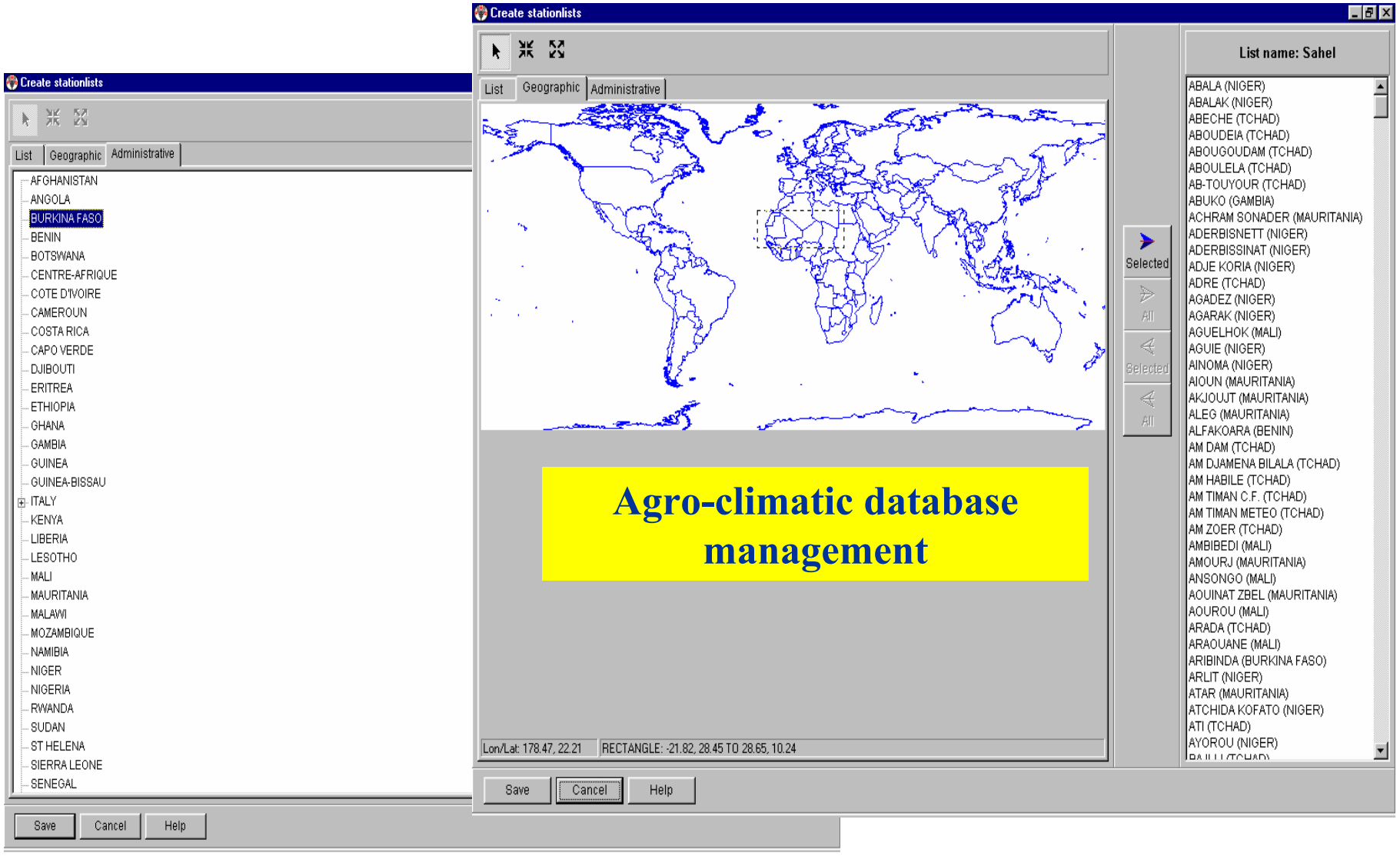
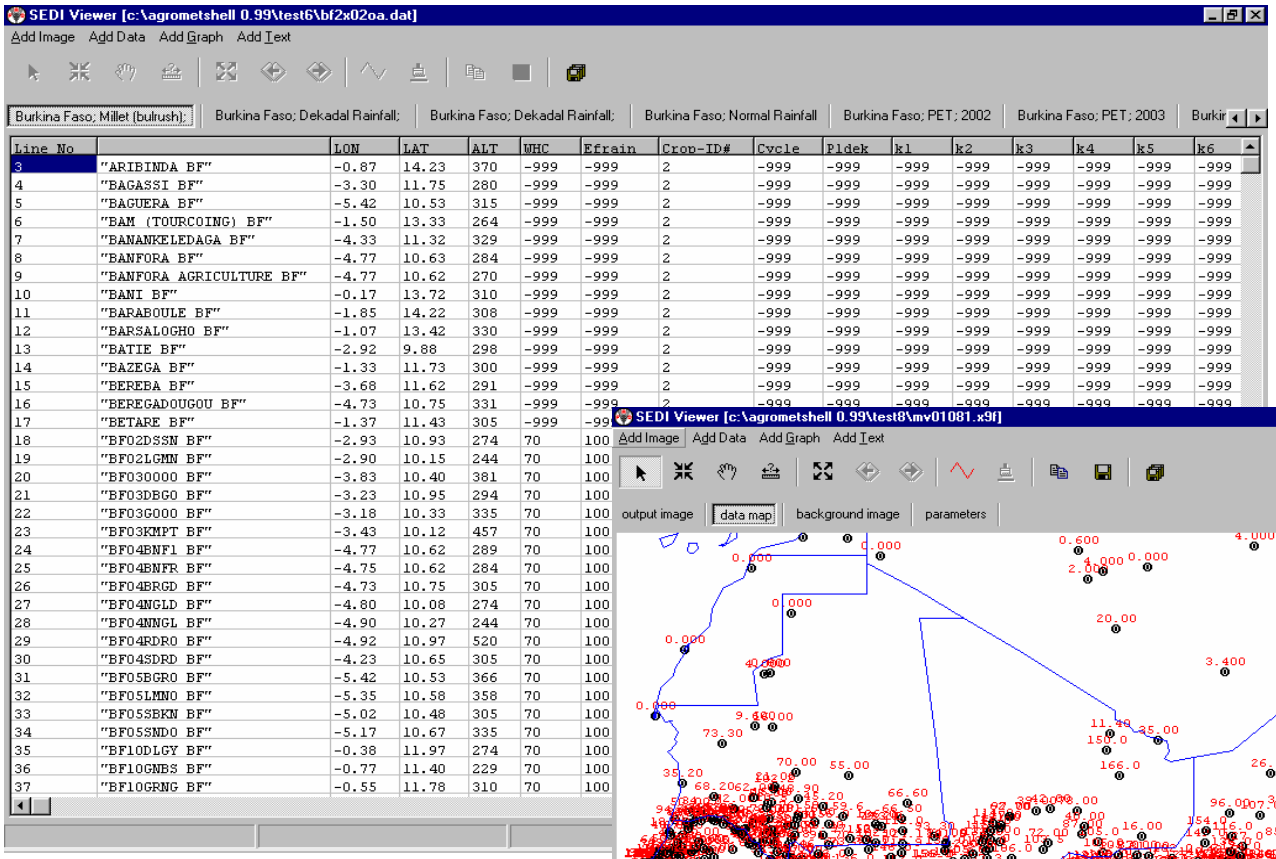
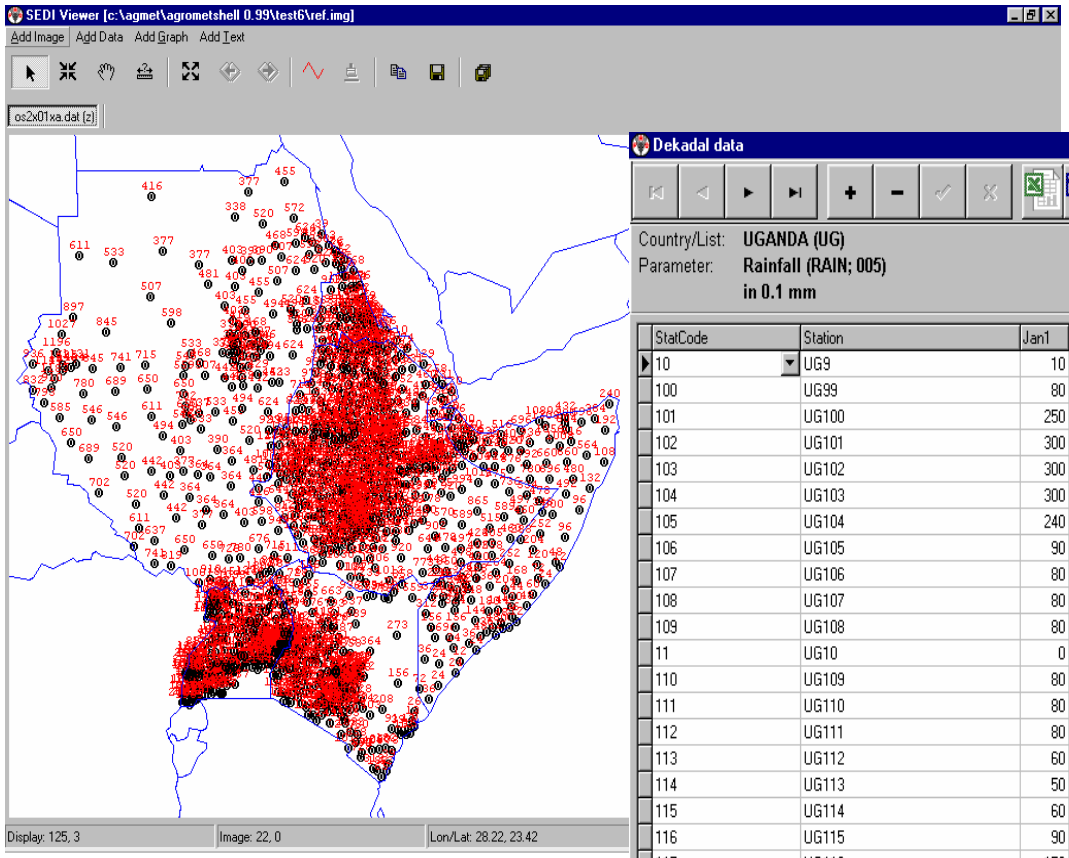


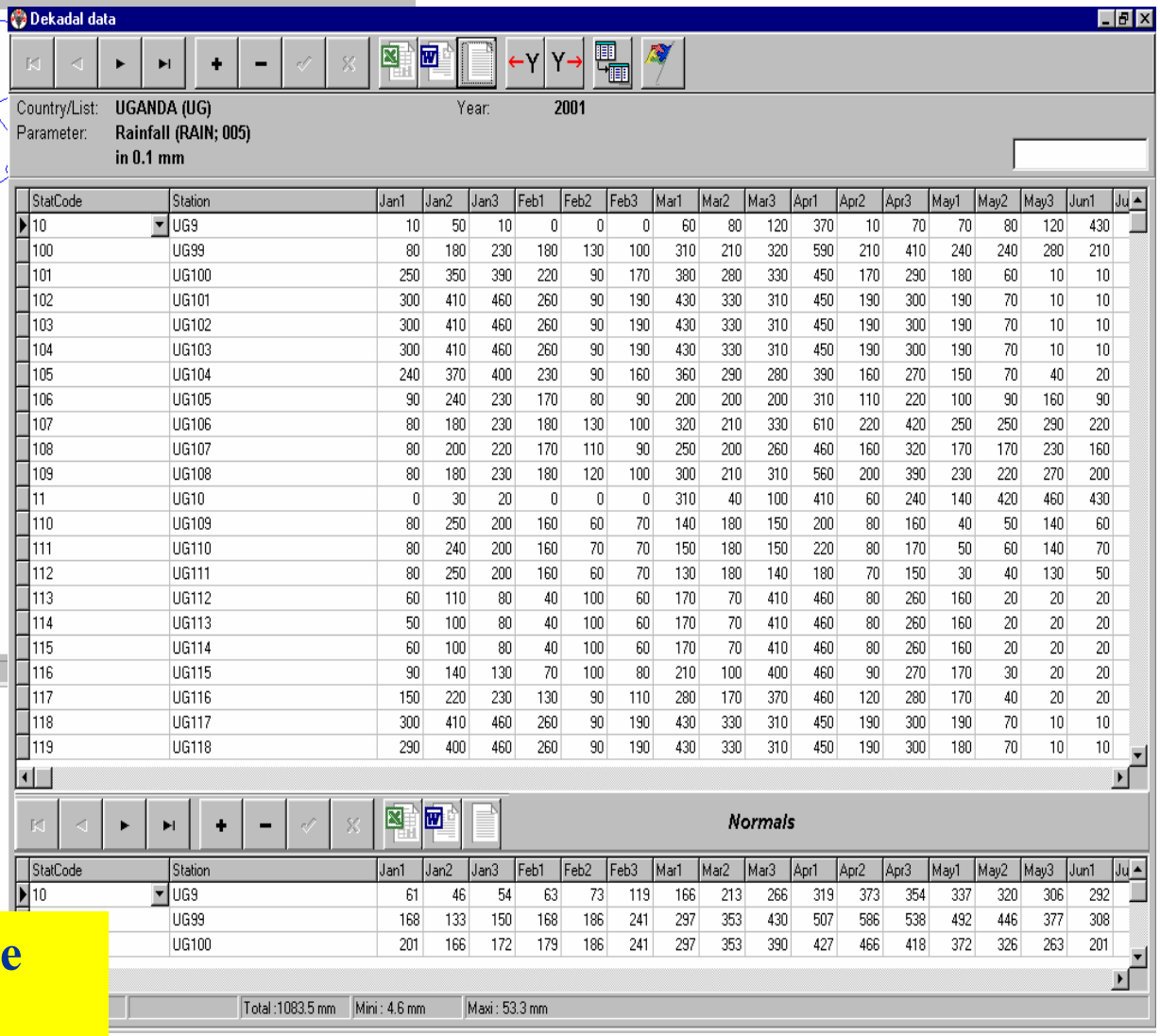
FAO Agro-meteorological toolbox



Agro-climatic database management

FAO Agro-meteorological toolbox





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100	UG99	80	180	230	180	130	100	310	210	320	590	210	410	240	240	280	210	
101	UG100	250	350	390	220	90	170	380	280	330	450	170	290	180	60	10	10	
102	UG101	300	410	460	260	90	190	430	330	310	450	190	300	190	70	10	10	
103	UG102	300	410	460	260	90	190	430	330	310	450	190	300	190	70	10	10	
104	UG103	300	410	460	260	90	190	430	330	310	450	190	300	190	70	10	10	
105	UG104	240	370	400	230	90	160	360	290	280	390	160	270	150	70	40	20	
106	UG105	90	240	230	170	80	90	200	200	200	310	110	220	100	90	160	90	
107	UG106	80	180	230	180	130	100	320	210	330	610	220	420	250	250	290	220	
108	UG107	80	200	220	170	110	90	250	200	260	460	160	320	170	170	230	160	
109	UG108	80	180	230	180	120	100	300	210	310	560	200	390	230	220	270	200	
11	UG10	0	30	20	0	0	0	310	40	100	410	60	240	140	420	460	430	
110	UG109	80	250	200	160	60	70	140	180	150	200	80	160	40	50	140	60	
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112	UG111	80	250	200	160	60	70	130	180	140	180	70	150	30	40	130	50	
113	UG112	60	110	80	40	100	60	170	70	410	460	80	260	160	20	20	20	
114	UG113	50	100	80	40	100	60	170	70	410	460	80	260	160	20	20	20	
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119	UG118	290	400	460	260	90	190	430	330	310	450	190	300	180	70	10	10	

StatCode	Station	Jan1	Jan2	Jan3	Feb1	Feb2	Feb3	Mar1	Mar2	Mar3	Apr1	Apr2	Apr3	May1	May2	May3	Jun1	Ju
10	UG9	61	46	54	63	73	119	166	213	266	319	373	354	337	320	306	292	
	UG99	168	133	150	168	186	241	297	353	430	507	586	538	492	446	377	308	
	UG100	201	166	172	179	186	241	297	353	390	427	466	418	372	326	263	201	

Agro-climatic database management

FAO Agro-meteorological toolbox

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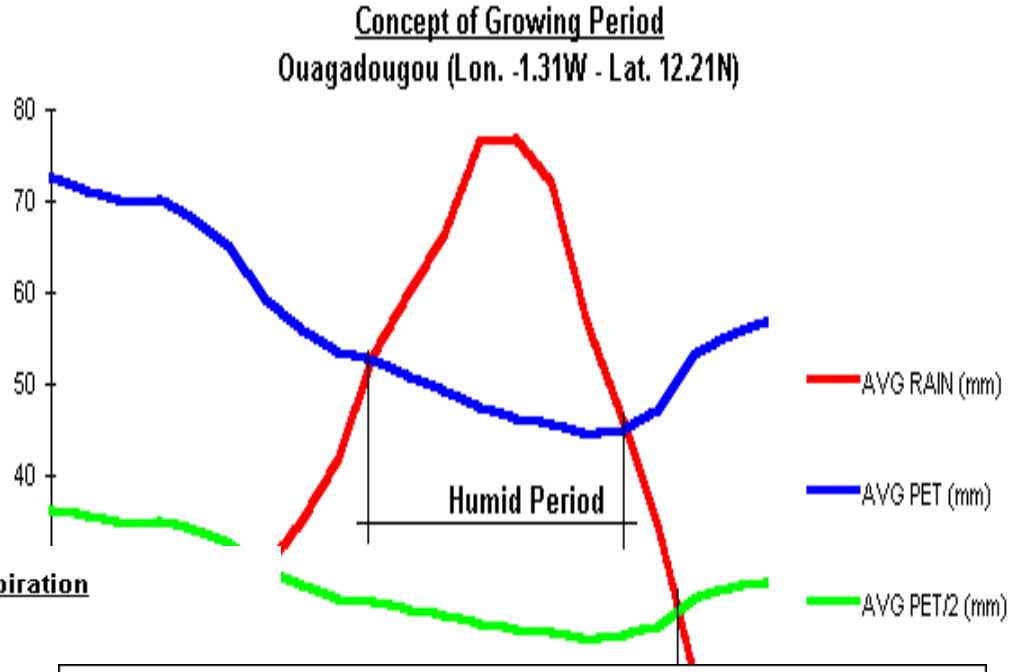
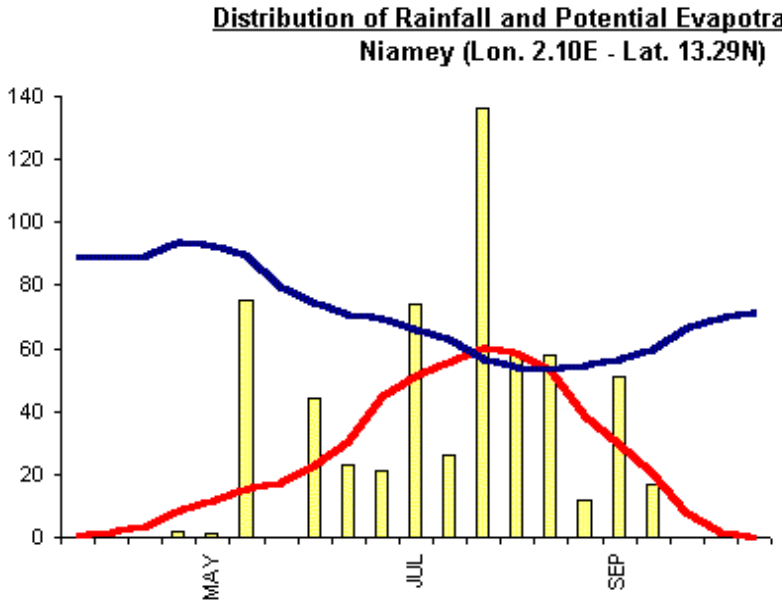
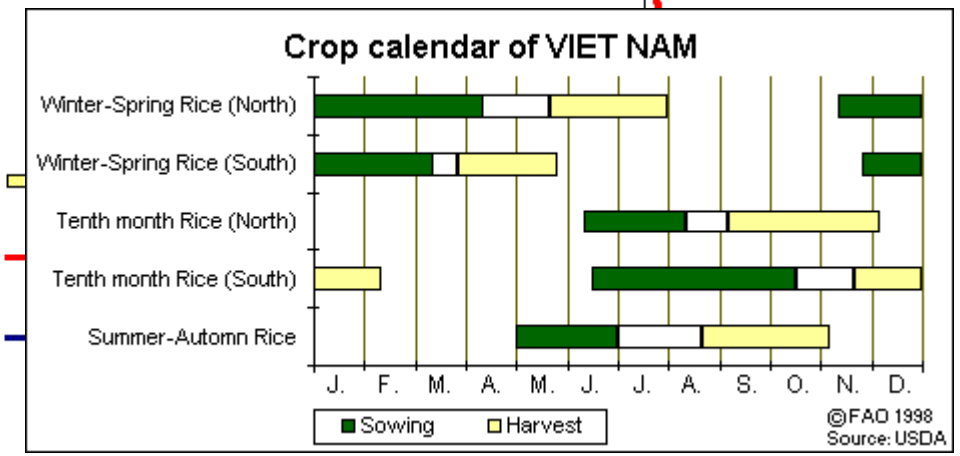
FAO Crop Specific Soil Water Balance

Remote Sensing Centre, AGRT

July 1992 Version 2.1







Agro-meteorological model

FAO Agro-meteorological toolbox

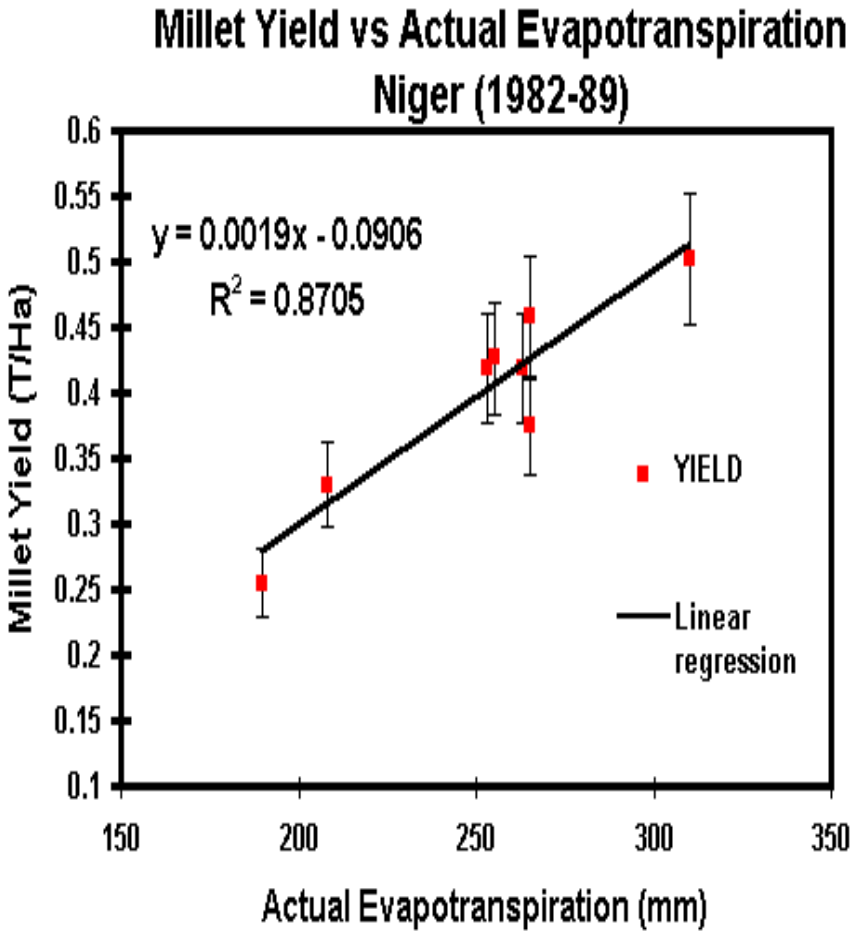
Cropping season: 1996-97

FAO Water Satisfaction Index for Millet (bulrush)

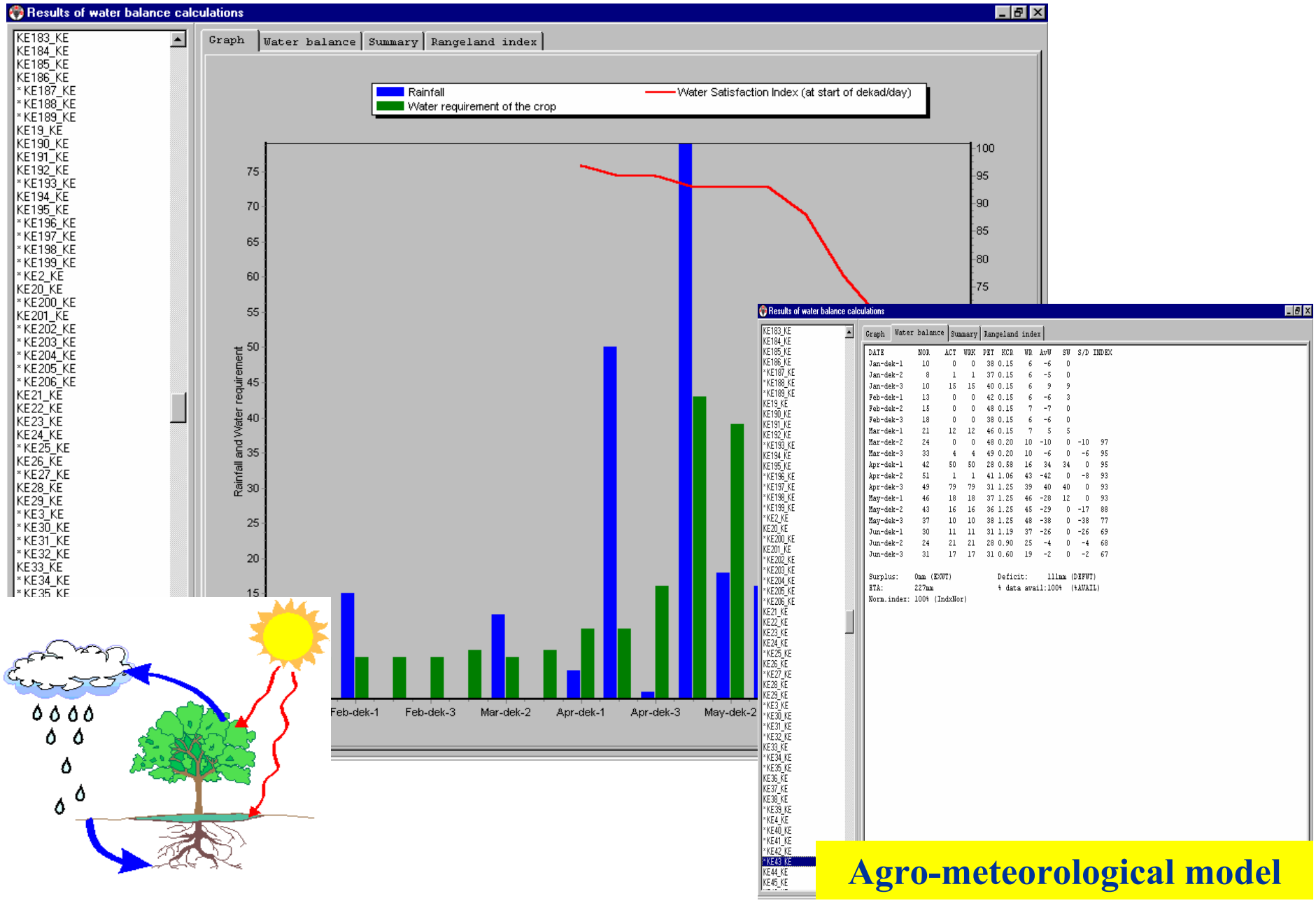
Station Name: NIAMEY-AERO (Elevation: 227 m)
Crop type: Millet (bulrush) - Cycle Length: 9 dekads
Total water requirements: 359 - Normal water requirements: 359
Planting dekad: 18 - Maximum soil water storage: 60 mm (WHC)
Effective/Total rain: 100% - Pre-season Kcr: 0.15

DEK	NOR	ACT	WRK	PET	KCR	WR	AvW	SW	S/D	INDEX
8	1	-999	1	91	0.15	14	-12	0		
9	2	-999	2	92	0.15	14	-11	0		
10	0	-999	0	89	0.15	13	-12	0		
11	2	-999	2	89	0.15	13	-10	0		
12	4	-999	4	89	0.15	13	-8	0		
13	8	2	2	94	0.15	14	-11	0		
14	12	1	1	93	0.15	14	-12	0		
15	16	75	75	89	0.15	13	62	60		
16	17	0	0	79	0.15	12	-11	48		
17	23	44	44	75	0.15	11	33	60		
18	31	23	23	71	0.32	23	0	60	0	100
19	45	21	21	69	0.51	35	-14	46	0	100
20	52	74	74	66	0.71	47	27	60	13	100
21	56	26	26	63	0.9	57	-31	29	0	100
22	60	136	136	57	1	57	79	60	48	100
23	59	58	58	54	1	54	4	60	4	100
24	53	58	58	53	0.81	43	15	60	15	100
25	39	-999	39	55	0.53	29	10	60	10	100
26	30	-999	30	57	0.25	14	16	60	16	100

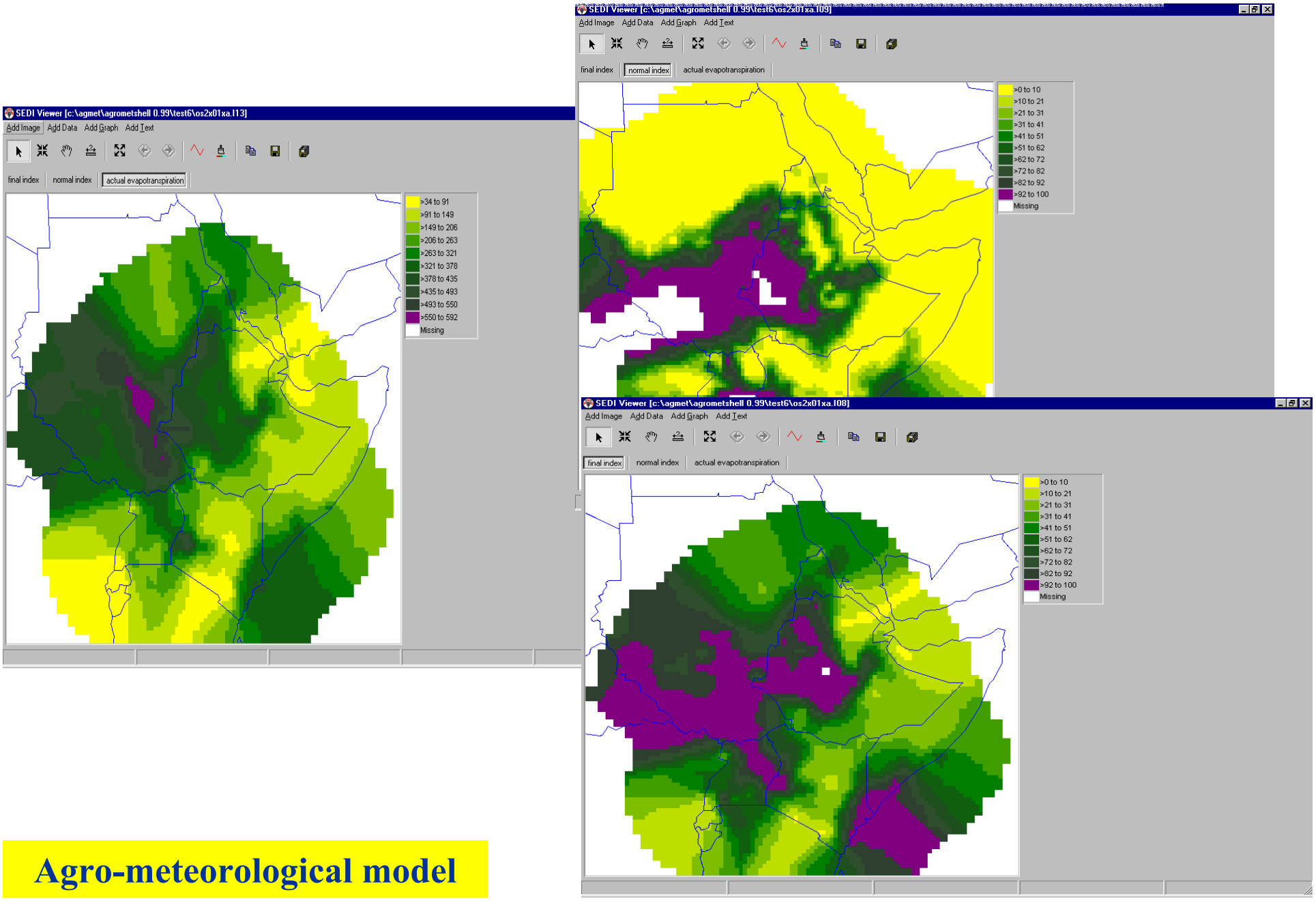
Agro-meteorological model



FAO Agro-meteorological toolbox



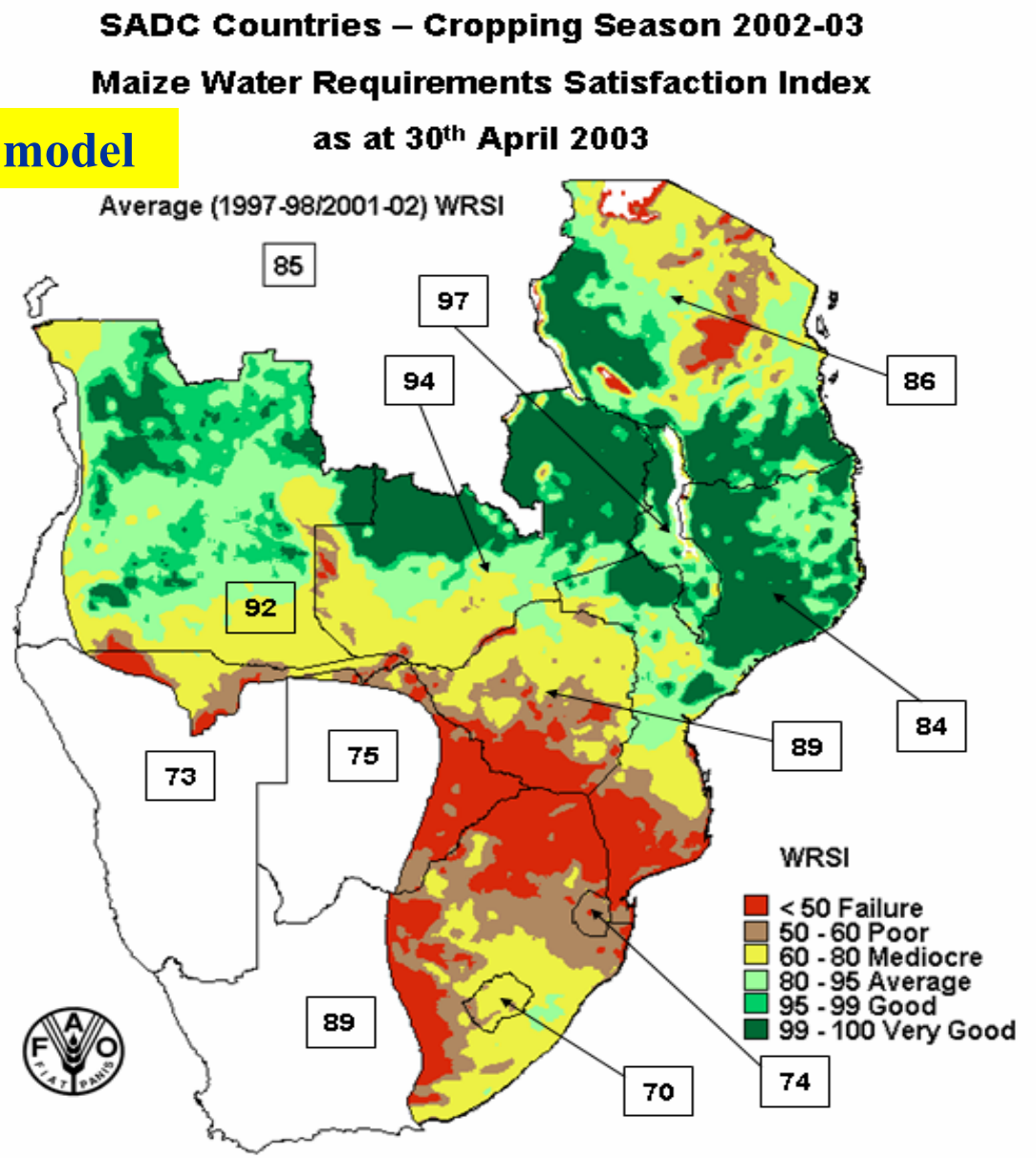
FAO Agro-meteorological toolbox



Agro-meteorological model

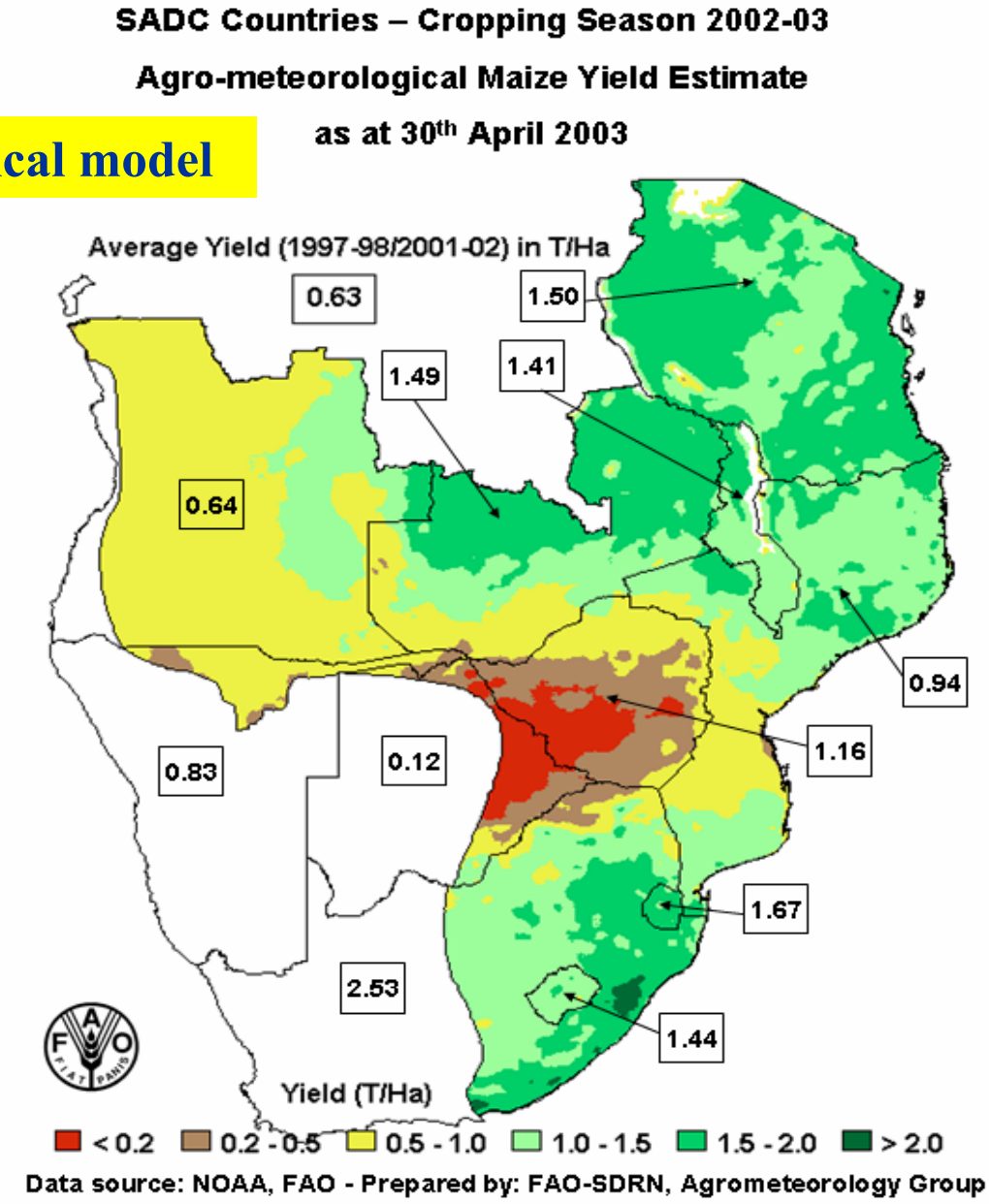
FAO Agro-meteorological toolbox

Agro-meteorological model



FAO Agro-meteorological toolbox

Agro-meteorological model



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Agrometeorological Crop Forecasting Tools

Environmental Info. Management Service

Apr. 1995 Ver. 1.14

SEDI Viewer [c:\agrometshell 0.99\test6\bf2x02oa.dat]

Add Image Add Data Add Graph Add Text

Burkina Faso; Millet (bulrush); | Burkina Faso; Dekadal Rainfall; | Burkina Faso; Dekadal Rainfall; | Burkina Faso; Normal Rainfall | Burkina Faso; PET; 2002 | Burkina Faso; PET; 2003 | Burkir

Line No		LON	LAT	ALT	WHC	Efrain	Crop-ID#	Cycle	Pldek	k1	k2	k3	k4	k5	k6	k7	k8
3	"BF02DSSN BF"	-2.93	10.93	274	70	100	2	14	13	0.30	0.38	0.50	0.63	0.75	0.88	1.00	1.0
4	"BF02LGMN BF"	-2.90	10.15	244	70	100	2	16	13	0.30	0.34	0.45	0.56	0.67	0.78	0.89	1.0
5	"BF030000 BF"	-3.83	10.40	381	70	100	2	16	13	0.30	0.34	0.45	0.56	0.67	0.78	0.89	1.0
6	"BF03DBGO BF"	-3.23	10.95	294	70	100	2	14	16	0.30	0.38	0.50	0.63	0.75	0.88	1.00	1.0
7	"BF03GOOO BF"	-3.18	10.33	335	70	100	2	16	13	0.30	0.34	0.45	0.56	0.67	0.78	0.89	1.0
8	"BF03KMPT BF"	-3.43	10.12	457	70	100	2	18	13	0.30	0.32	0.42	0.51	0.61	0.71	0.81	0.9
9	"BF04BNF1 BF"	-4.77	10.62	289	70	100	2	15	13	0.30	0.36	0.48	0.59	0.71	0.82	0.94	1.0
10	"BF04BNFR BF"	-4.75	10.62	284	70	100	2	15	13	0.30	0.36	0.48	0.59	0.71	0.82	0.94	1.0
11	"BF04BRGD BF"	-4.73	10.75	305	70	100	2	15	13	0.30	0.36	0.48	0.59	0.71	0.82	0.94	1.0
12	"BF04NGLD BF"	-4.80	10.08	274	70	100	2	17	13	0.30	0.33	0.43	0.54	0.64	0.74	0.85	0.9
13	"BF04NNGL BF"	-4.90	10.27	244	70	100	2	16	13	0.30	0.34	0.45	0.56	0.67	0.78	0.89	1.0
14	"BF04RDRO BF"	-4.92	10.97	520	70	100	2	14	13	0.30	0.38	0.50	0.63	0.75	0.88	1.00	1.0
15	"BF04SDRD BF"	-4.23	10.65	305	70	100	2	16	13	0.30	0.34	0.45	0.56	0.67	0.78	0.89	1.0
16	"BF05BGRO BF"	-5.42	10.53	366	70	100	2	16	13	0.30	0.34	0.45	0.56	0.67	0.78	0.89	1.0
17	"BF05LMNO BF"	-5.35	10.58	358	70	100	2	15	13	0.30	0.36	0.48	0.59	0.71	0.82	0.94	1.0
18	"BF05SBKN BF"	-5.02	10.48	305	70	100	2	15	13	0.30	0.36	0.48	0.59	0.71	0.82	0.94	1.0
19	"BF05SNDO BF"	-5.17	10.67	335	70	100	2	15	13	0.30	0.36	0.48	0.59	0.71	0.82	0.94	1.0
20	"BF10DLGY BF"	-0.38	11.97	274	70	100	2	12	13	0.30	0.42	0.56	0.71	0.85	1.00	1.00	1.0
21	"BF10GNBS BF"	-0.77	11.40	229	70	100	2	13	13	0.30	0.39	0.53	0.66	0.80	0.93	1.00	1.0
22	"BF10GRNG BF"	-0.55	11.78	310	70	100	2	11	14	0.30	0.44	0.60	0.76	0.92	1.00	1.00	0.9
				.73	274	70	100	2	13	13	0.30	0.39	0.53	0.66	0.80	0.93	1.00	1.0
				.77	228	70	100	2	12	14	0.30	0.42	0.56	0.71	0.85	1.00	1.00	1.0
				.23	200	70	100	2	14	13	0.30	0.38	0.50	0.63	0.75	0.88	1.00	1.0
				.53	289	70	100	2	13	13	0.30	0.39	0.53	0.66	0.80	0.93	1.00	1.0
				.10	259	70	100	2	13	13	0.30	0.39	0.53	0.66	0.80	0.93	1.00	1.0
				.77	265	70	100	2	13	14	0.30	0.39	0.53	0.66	0.80	0.93	1.00	1.0
				.17	274	70	100	2	14	13	0.30	0.38	0.50	0.63	0.75	0.88	1.00	1.0
				.43	290	70	100	2	14	13	0.30	0.38	0.50	0.63	0.75	0.88	1.00	1.0
				.73	297	70	100	2	12	13	0.30	0.42	0.56	0.71	0.85	1.00	1.00	1.0
				.70	274	70	100	2	12	13	0.30	0.42	0.56	0.71	0.85	1.00	1.00	1.0
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				.87	290	70	100	2	12	13	0.30	0.42	0.56	0.71	0.85	1.00	1.00	1.0
				.15	322	70	100	2	13	15	0.30	0.39	0.53	0.66	0.80	0.93	1.00	1.0
				.55	366	70	100	2	14	16	0.30	0.38	0.50	0.63	0.75	0.88	1.00	1.0
				.05	351	70	100	2	14	13	0.30	0.38	0.50	0.63	0.75	0.88	1.00	1.0

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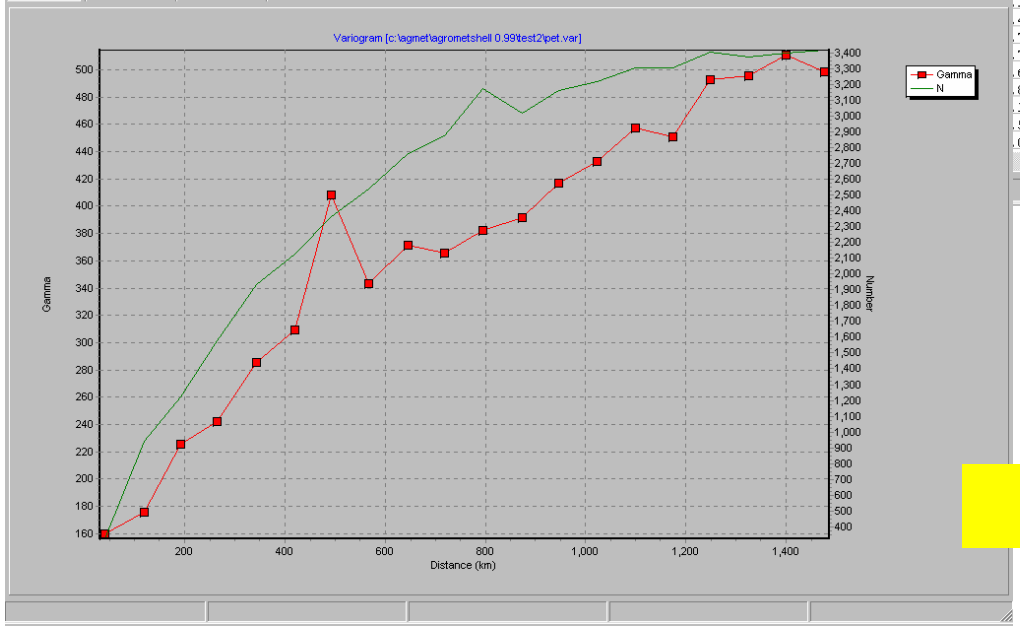
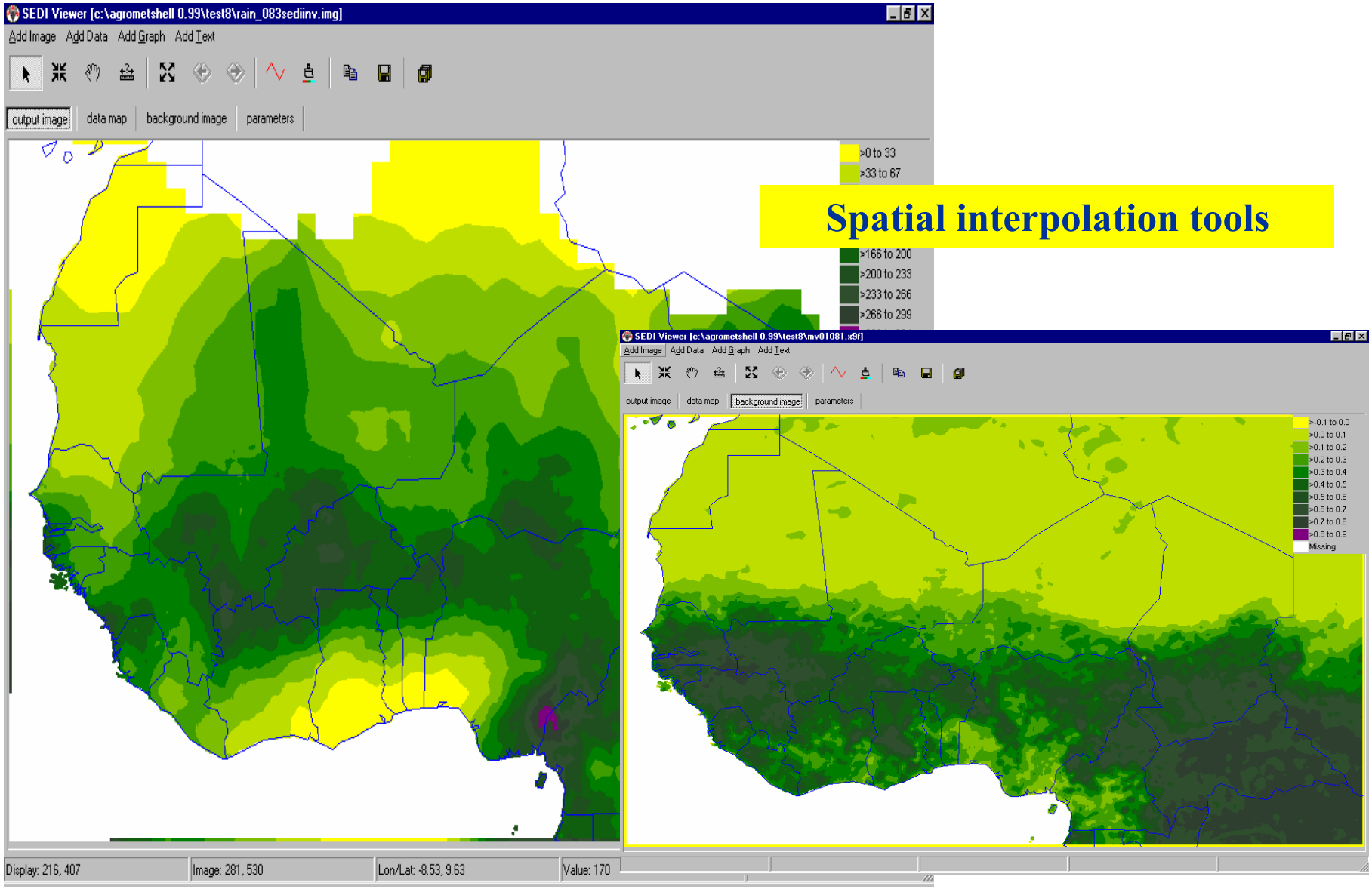
Add Image Add Data Add Graph Add Text

variogram | input data | parameters

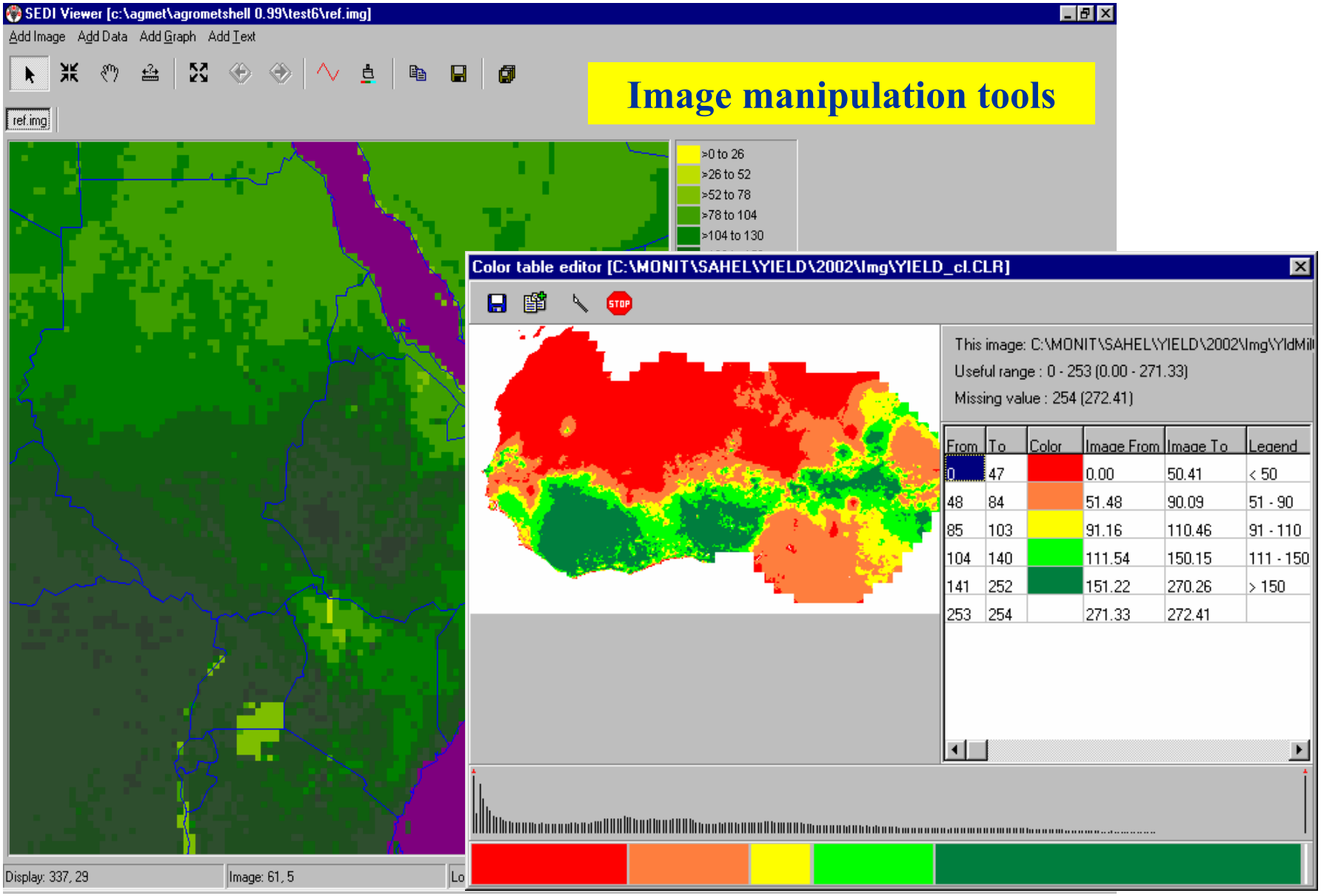


Other agro-meteorological tools

FAO Agro-meteorological toolbox



FAO Agro-meteorological toolbox



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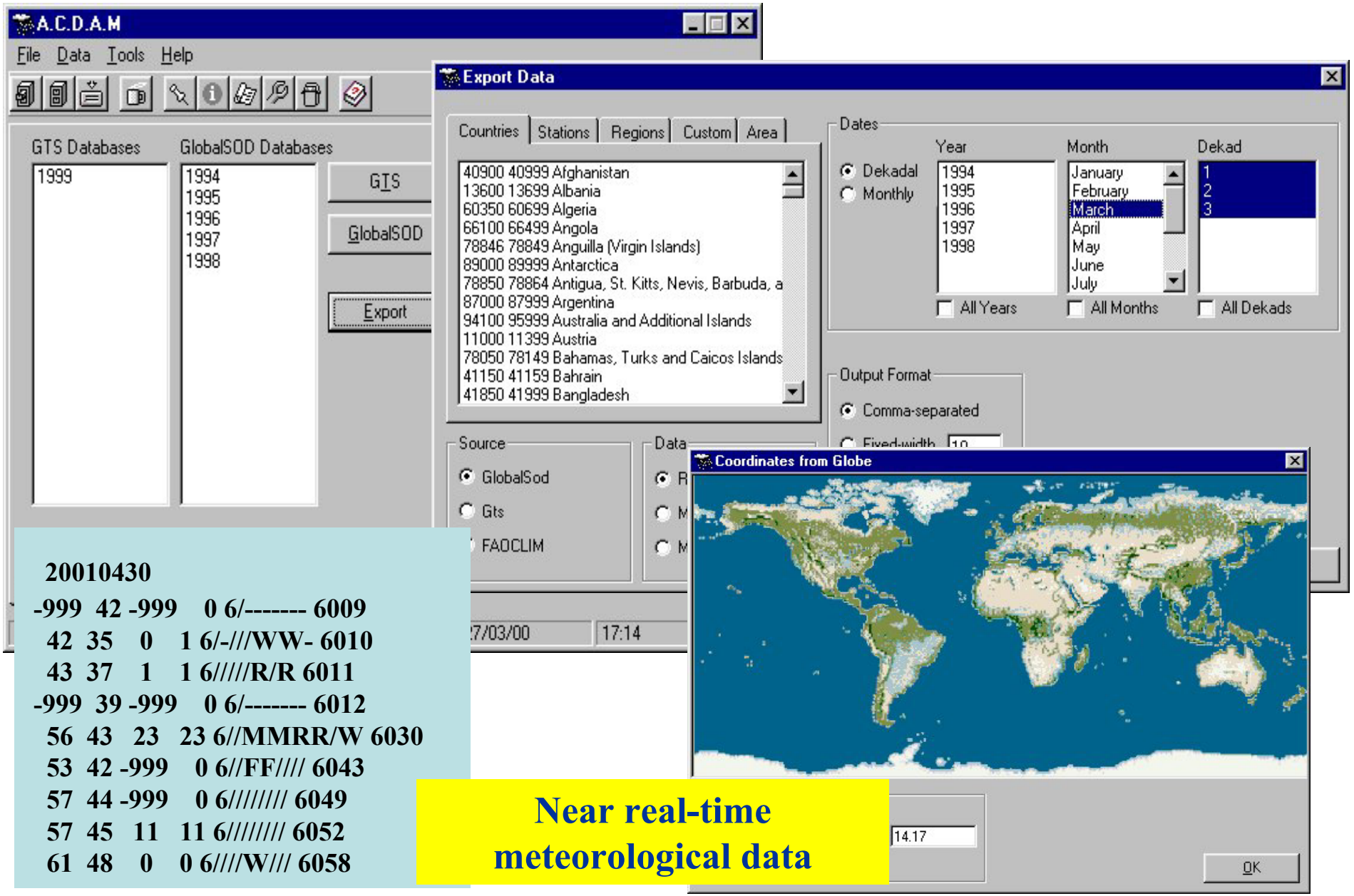


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  43  37    1    1 6/////R/R 6011
-999  39 -999    0 6/------- 6012
  56  43   23   23 6//MMRR/W 6030
  53  42 -999    0 6//FF//// 6043
  57  44 -999    0 6//////// 6049
  57  45   11   11 6//////// 6052
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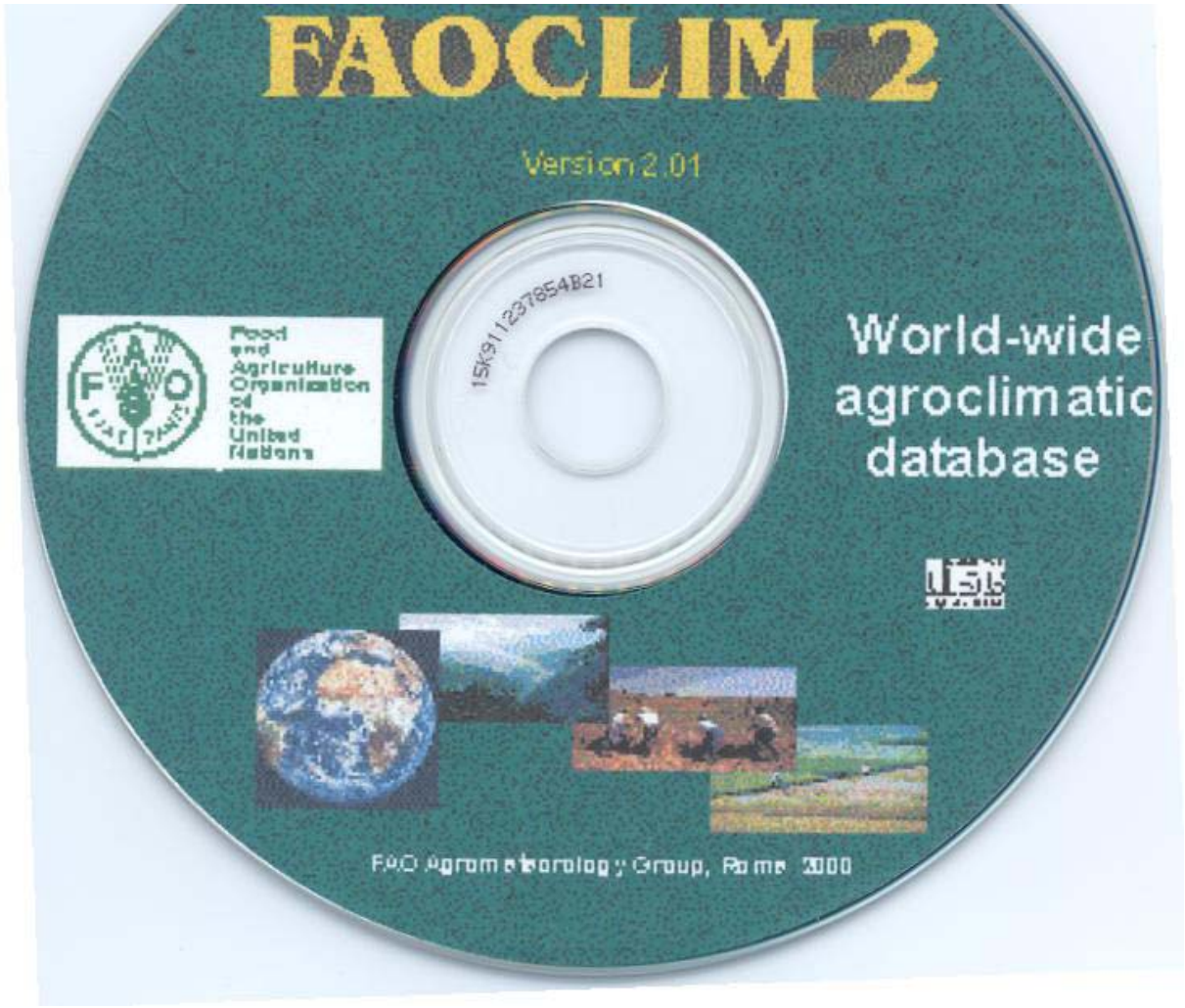
Near real-time meteorological data

FAOCLIM-2


FAOCLIM 2
Version 2.01
Food and Agriculture Organization of the United Nations
World-wide agroclimatic database
FAO Agrometeorology Group, Rome 2000

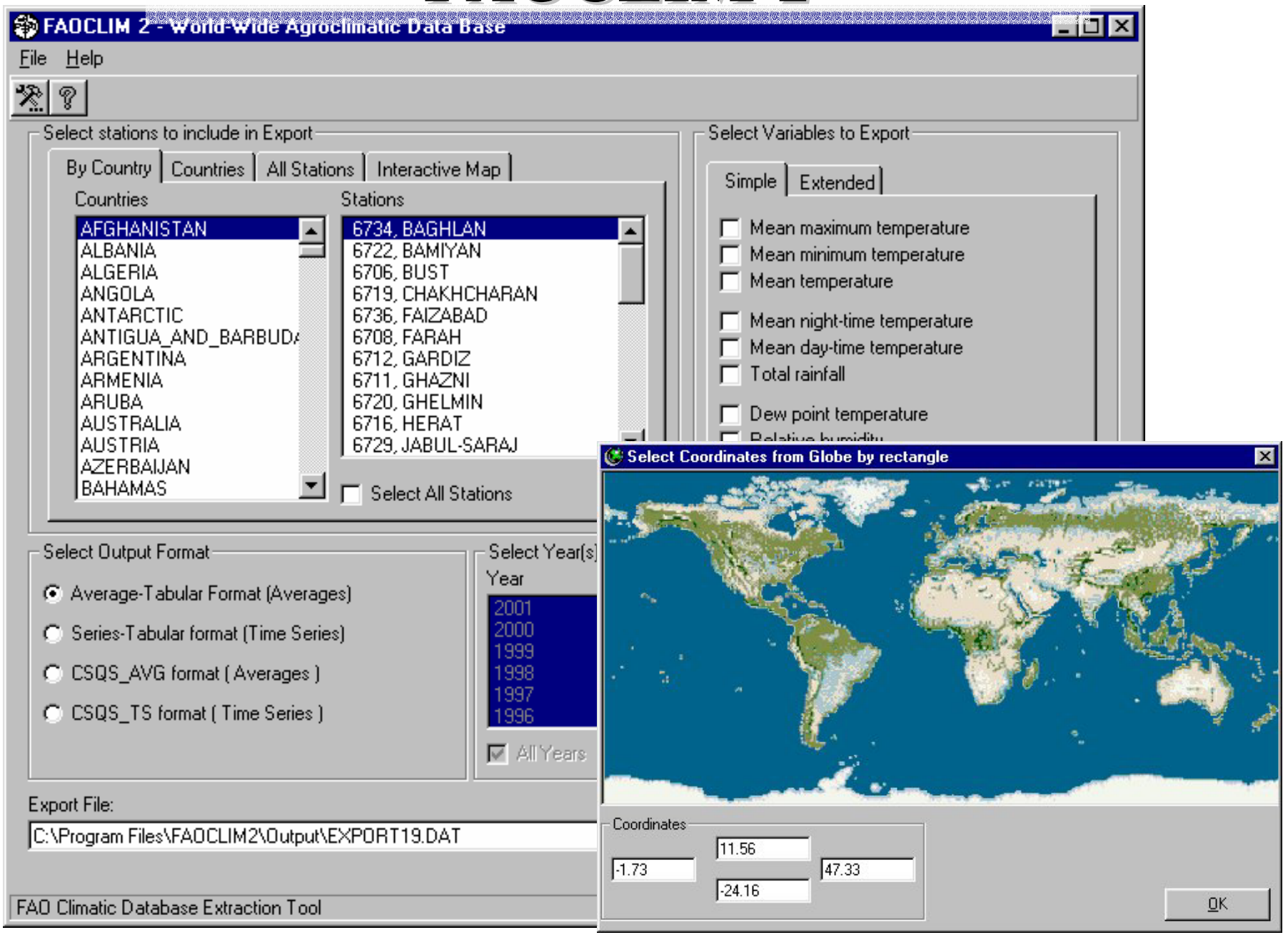
FAOCLIM-2


FAOCLIM 2 - World-Wide Agroclimatic Data Base
FAOCLIM 2
World-wide agroclimatic database
Food and Agriculture Organization
of the United Nations
Environment and Natural Resources Service - Agrometeorology Group
Next >

FAOCLIM-2

- 28106 stations
- Monthly data for up to 14 parameters
- recalculated averages (1961-90)
- FAOCLIM exports data for further processing
- GeoContext visualizes the data in FAOCLIM

FAOCLIM-2


FAOCLIM 2 - World-Wide Agroclimatic Data Base
File
Help
Select stations to include in Export
By Country
Countries
All Stations
Interactive Map
Countries
AFGHANISTAN
ALBANIA
ALGERIA
ANGOLA
ANTARCTIC
ANTIGUA_AND_BARBUDA
ARGENTINA
ARMENIA
ARUBA
AUSTRALIA
AUSTRIA
AZERBAIJAN
BAHAMAS
Stations
6734, BAGHLAN
6722, BAMIYAN
6706, BUST
6719, CHAKHCHARAN
6736, FAIZABAD
6708, FARAH
6712, GARDIZ
6711, GHAZNI
6720, GHELMIN
6716, HERAT
6729, JABUL-SARAJ
Select All Stations
Select Variables to Export
Simple
Extended
Mean maximum temperature
Mean minimum temperature
Mean temperature
Mean night-time temperature
Mean day-time temperature
Total rainfall
Dew point temperature
Select Output Format
Average-Tabular Format (Averages)
Series-Tabular format (Time Series)
CSQS_AVG format (Averages)
CSQS_TS format (Time Series)
Select Year(s)
Year
2001
2000
1999
1998
1997
1996
All Years
Export File:
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FAO Climatic Database Extraction Tool
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Coordinates
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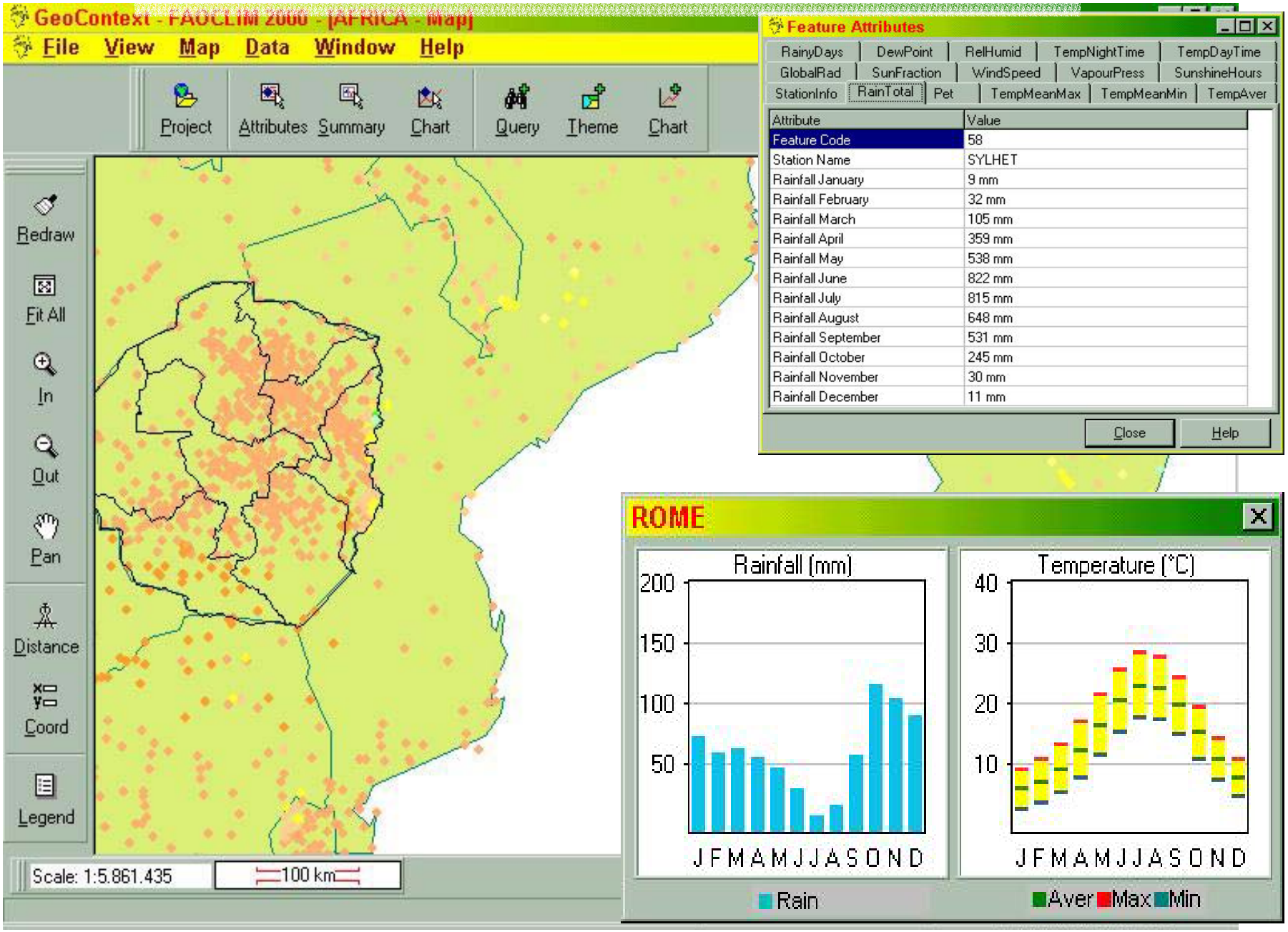
OK

FAOCLIM-2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Redraw
Fit All
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Out
Pan
Distance
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Legend
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100 km
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GlobalRad SunFraction WindSpeed VapourPress SunshineHours
StationInfo RainTotal Pet TempMeanMax TempMeanMin TempAver
Attribute Value
Feature Code 58
Station Name SYLHET
Rainfall January 9 mm
Rainfall February 32 mm
Rainfall March 105 mm
Rainfall April 359 mm
Rainfall May 538 mm
Rainfall June 822 mm
Rainfall July 815 mm
Rainfall August 648 mm
Rainfall September 531 mm
Rainfall October 245 mm
Rainfall November 30 mm
Rainfall December 11 mm
Close Help
ROME
Rainfall (mm)
200
150
100
50
J F M A M J J A S O N D
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Temperature (°C)
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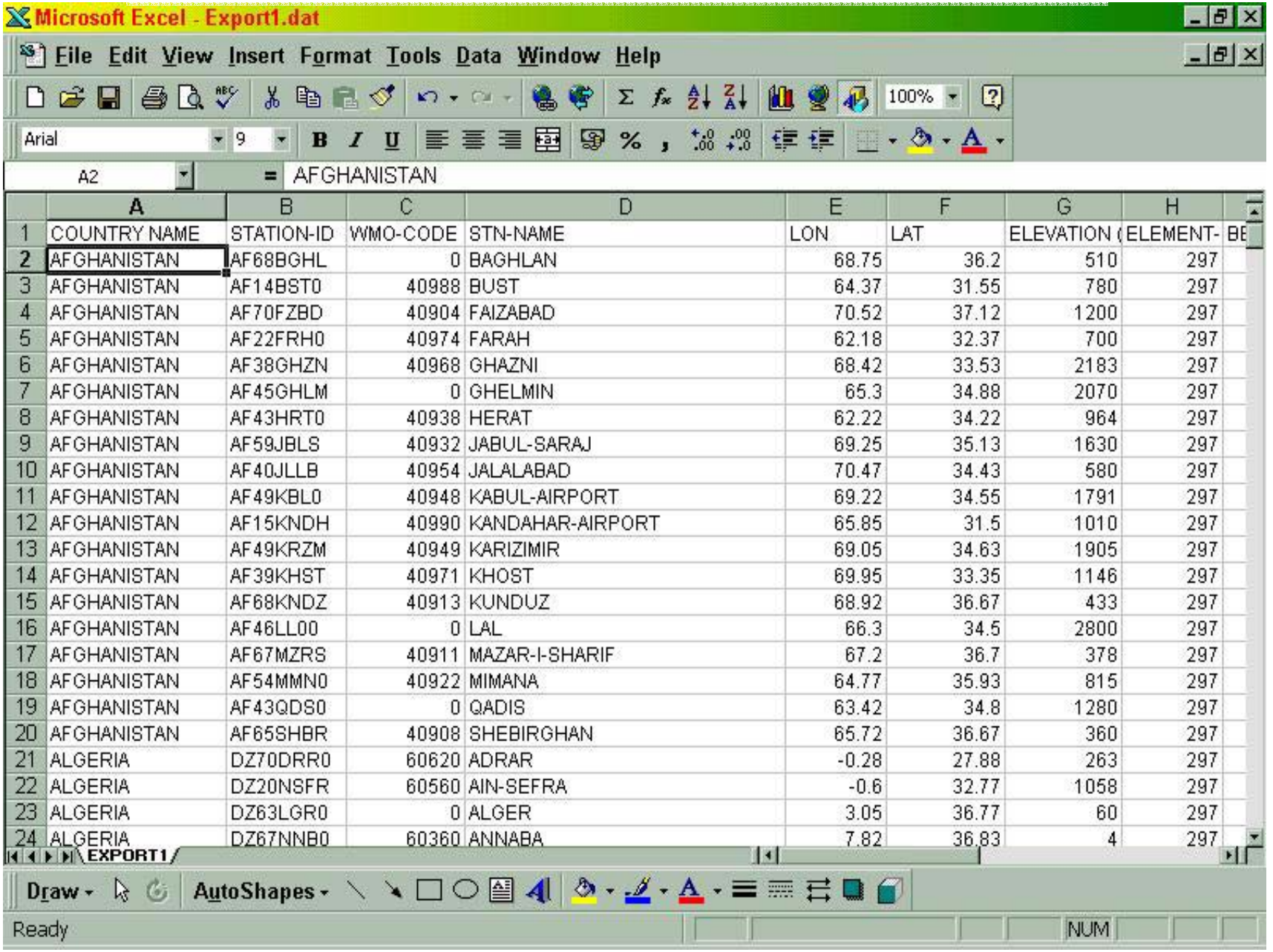
J F M A M J J A S O N D
Aver Max Min

FAOCLIM-2



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3	AFGHANISTAN	AF14BST0	40988	BUST	64.37	31.55	780	297
4	AFGHANISTAN	AF70FZBD	40904	FAIZABAD	70.52	37.12	1200	297
5	AFGHANISTAN	AF22FRH0	40974	FARAH	62.18	32.37	700	297
6	AFGHANISTAN	AF38GHZN	40968	GHAZNI	68.42	33.53	2183	297
7	AFGHANISTAN	AF45GHLM	0	GHELMIN	65.3	34.88	2070	297
8	AFGHANISTAN	AF43HRT0	40938	HERAT	62.22	34.22	964	297
9	AFGHANISTAN	AF59JBLS	40932	JABUL-SARAJ	69.25	35.13	1630	297
10	AFGHANISTAN	AF40JLLB	40954	JALALABAD	70.47	34.43	580	297
11	AFGHANISTAN	AF49KBL0	40948	KABUL-AIRPORT	69.22	34.55	1791	297
12	AFGHANISTAN	AF15KNDH	40990	KANDAHAR-AIRPORT	65.85	31.5	1010	297
13	AFGHANISTAN	AF49KRZM	40949	KARIZIMIR	69.05	34.63	1905	297
14	AFGHANISTAN	AF39KHST	40971	KHOST	69.95	33.35	1146	297
15	AFGHANISTAN	AF68KNDZ	40913	KUNDUZ	68.92	36.67	433	297
16	AFGHANISTAN	AF46LL00	0	LAL	66.3	34.5	2800	297
17	AFGHANISTAN	AF67MZRS	40911	MAZAR-I-SHARIF	67.2	36.7	378	297
18	AFGHANISTAN	AF54MMN0	40922	MIMANA	64.77	35.93	815	297
19	AFGHANISTAN	AF43QDS0	0	QADIS	63.42	34.8	1280	297
20	AFGHANISTAN	AF65SHBR	40908	SHEBIRGHAN	65.72	36.67	360	297
21	ALGERIA	DZ70DRR0	60620	ADRAR	-0.28	27.88	263	297
22	ALGERIA	DZ20NSFR	60560	AIN-SEFRA	-0.6	32.77	1058	297
23	ALGERIA	DZ63LGR0	0	ALGER	3.05	36.77	60	297
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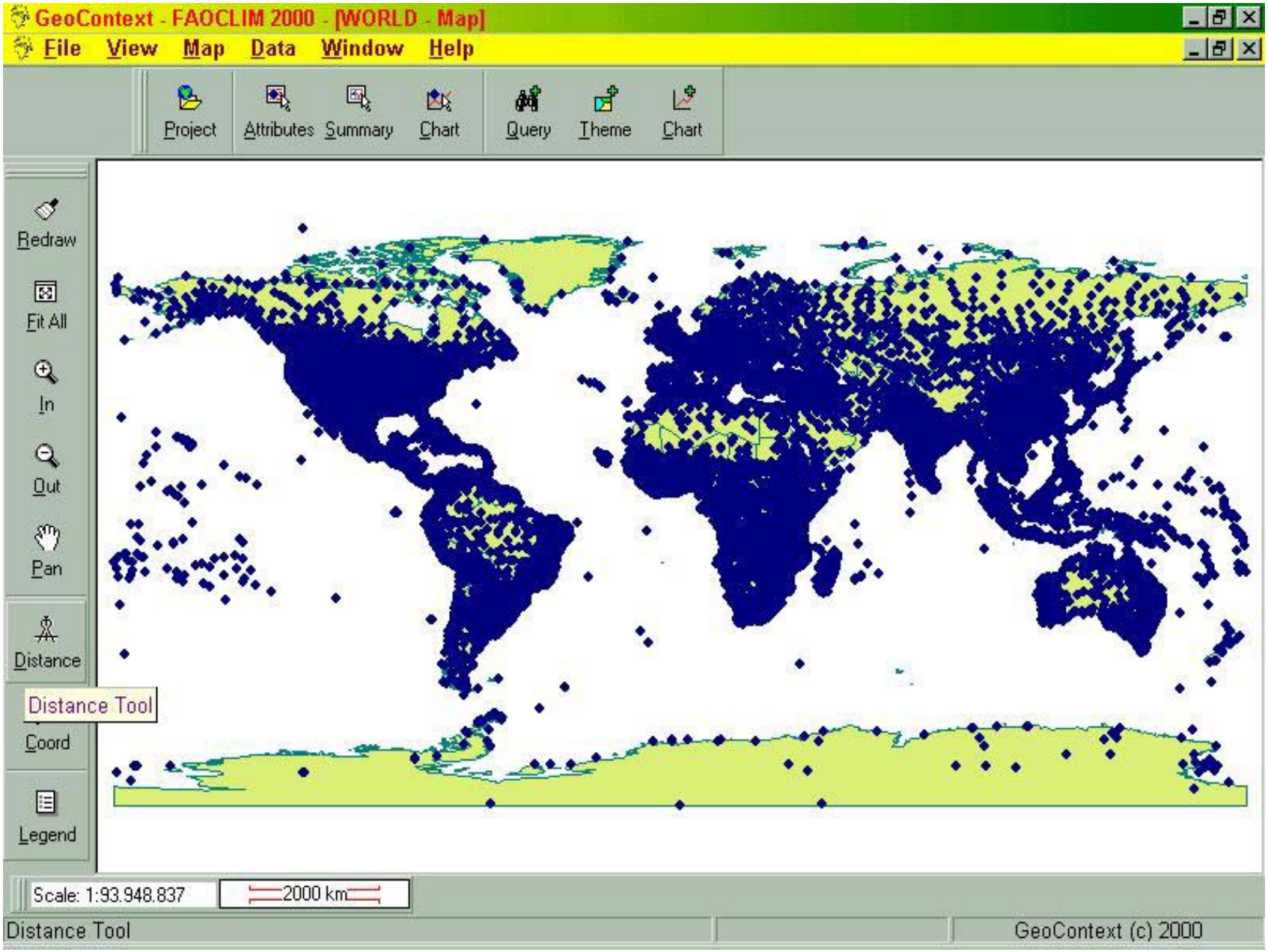
FAOCLIM-2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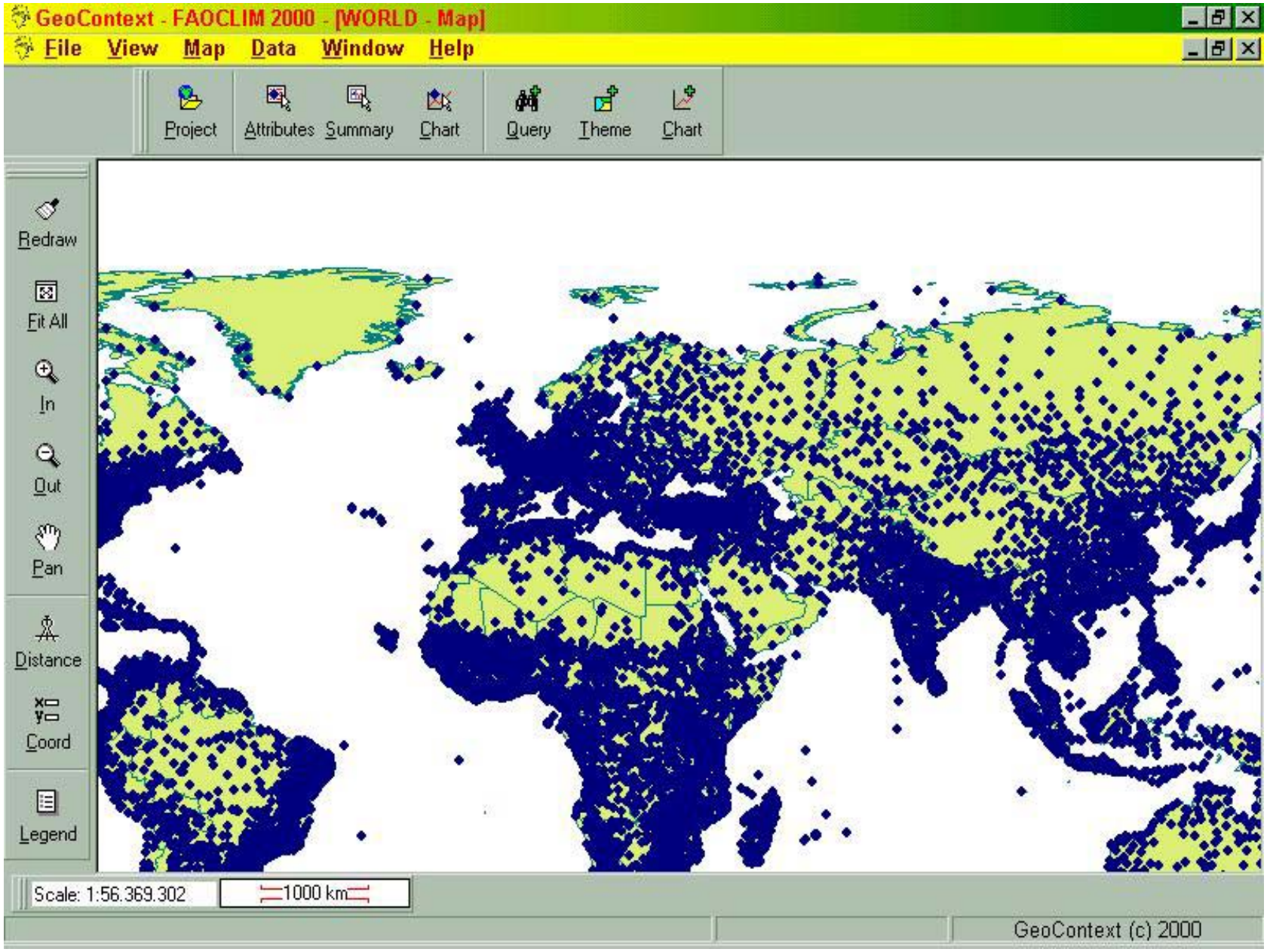
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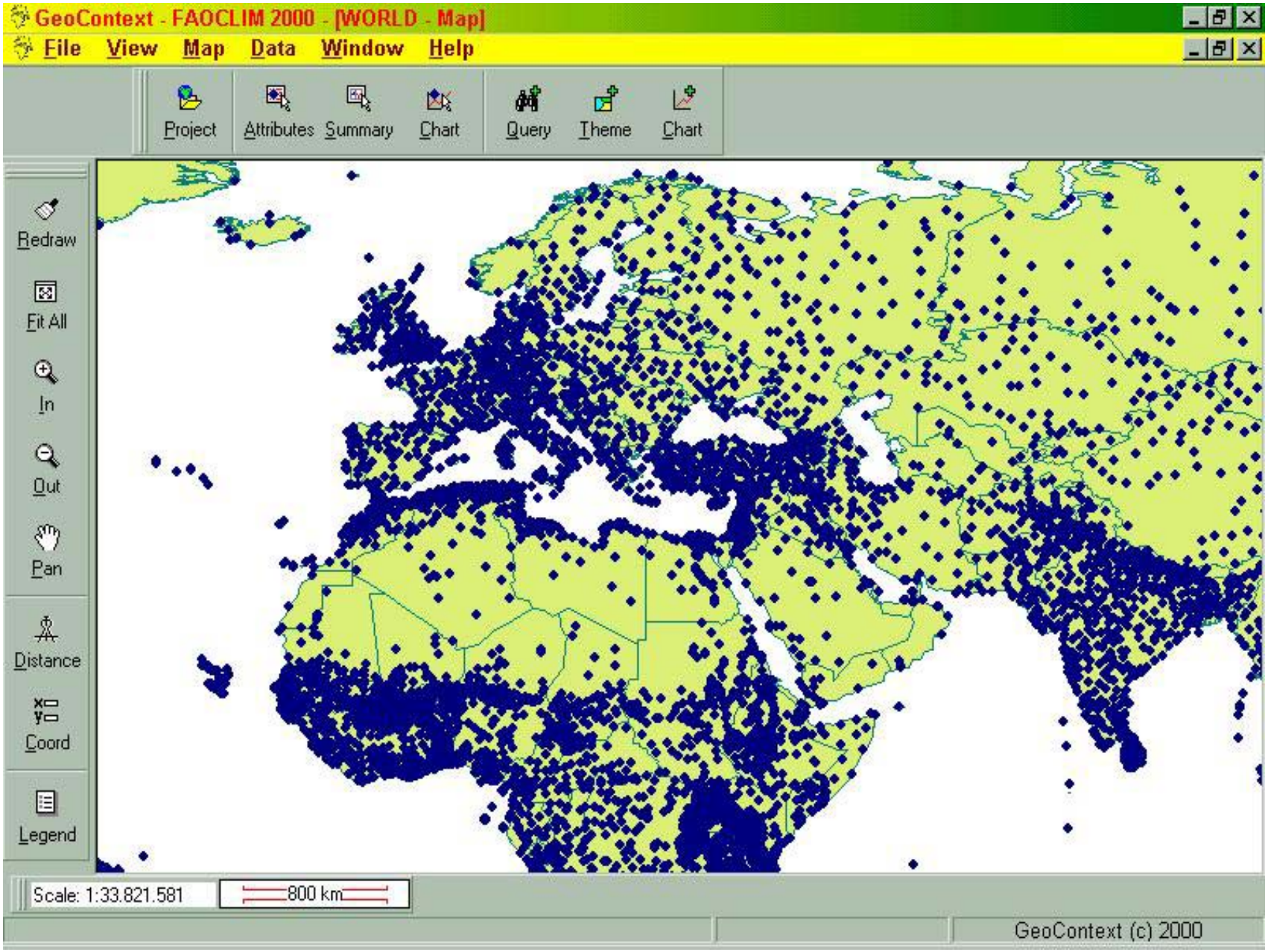
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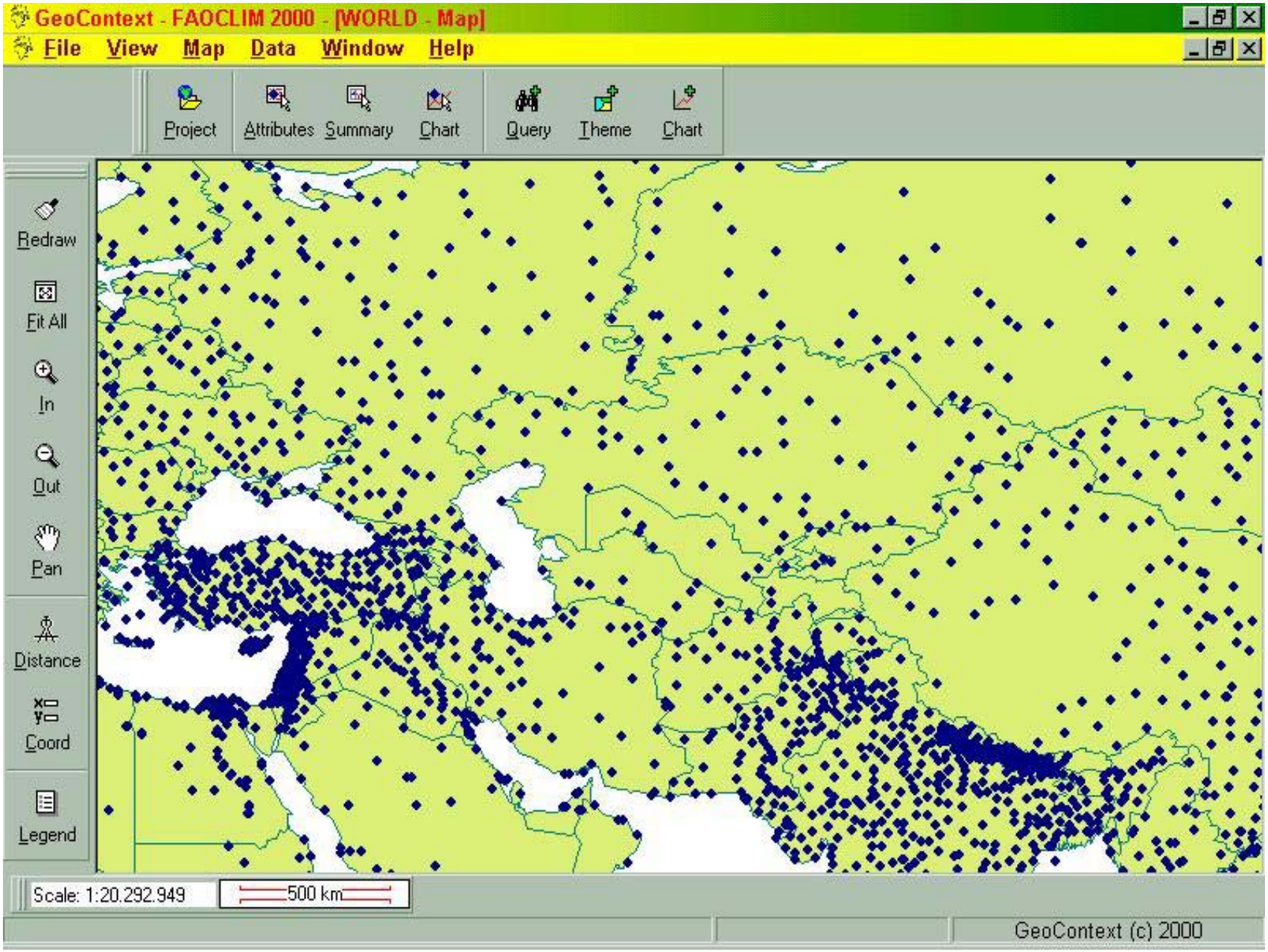
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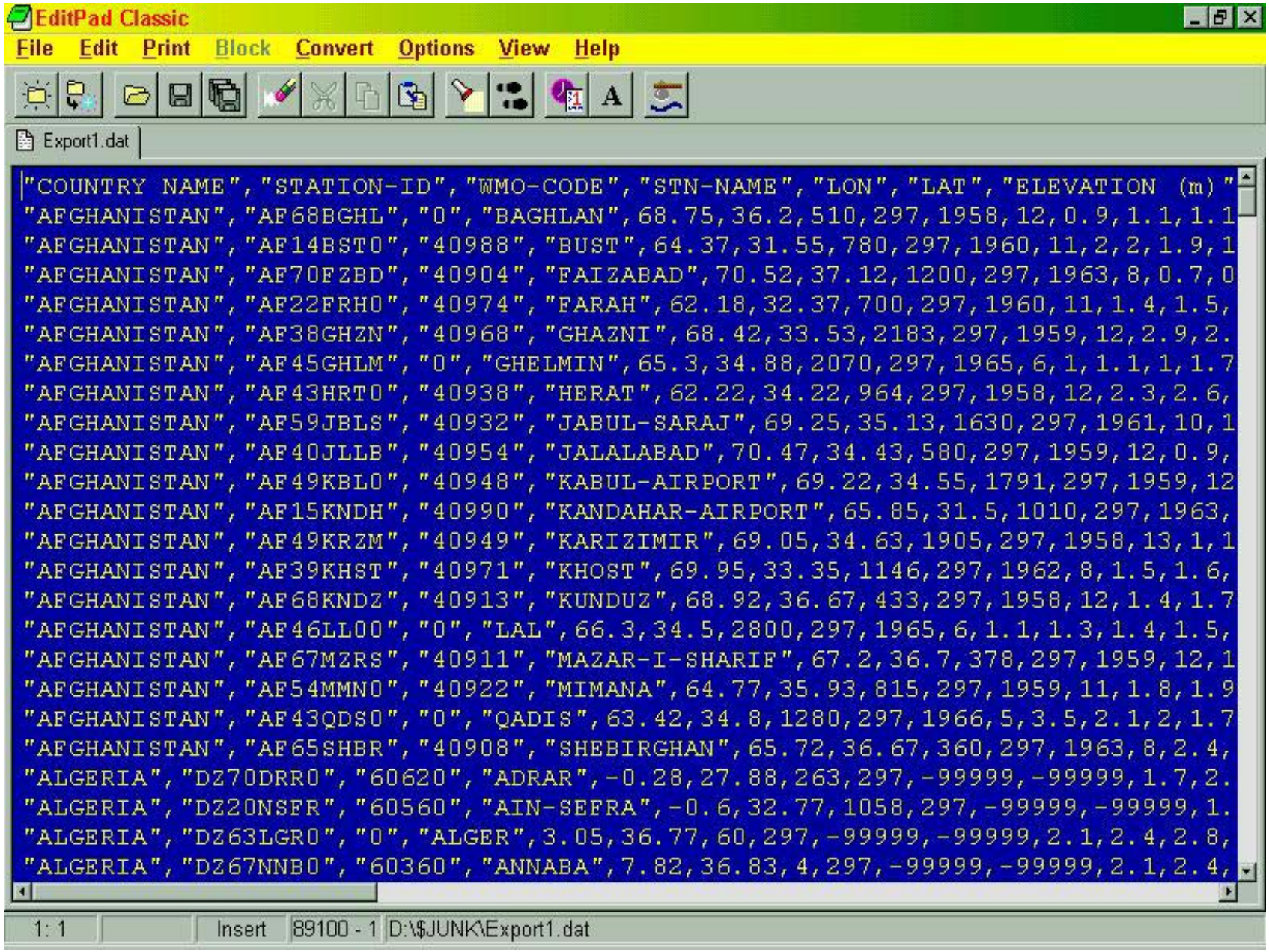
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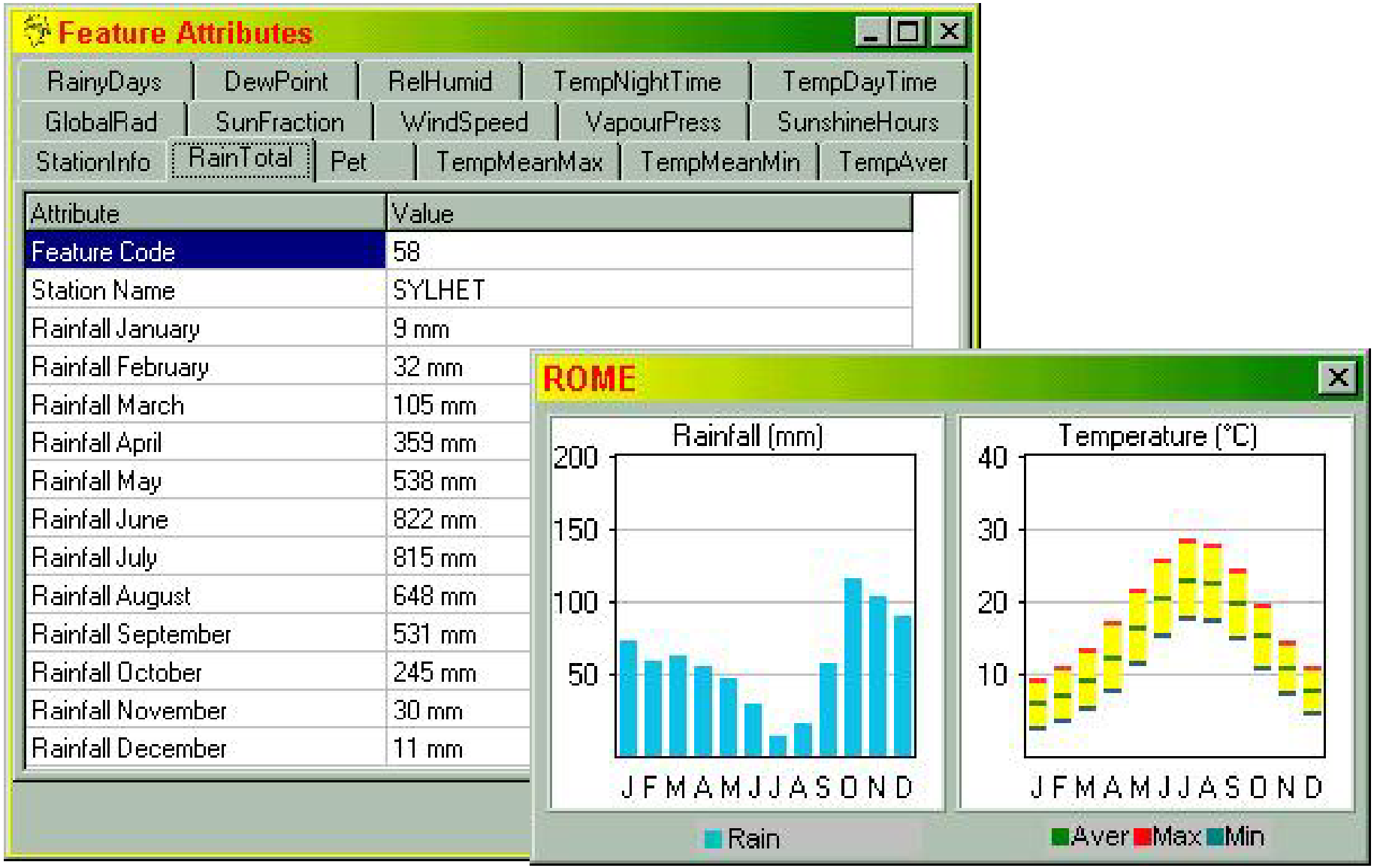
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Pet
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TempMeanMin
TempAver
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Value
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SYLHET
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Rainfall February
32 mm
Rainfall March
105 mm
Rainfall April
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Rainfall May
538 mm
Rainfall June
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Rainfall July
815 mm
Rainfall August
648 mm
Rainfall September
531 mm
Rainfall October
245 mm
Rainfall November
30 mm
Rainfall December
11 mm
ROME
Rainfall (mm)
200
150
100
50
J F M A M J J A S O N D
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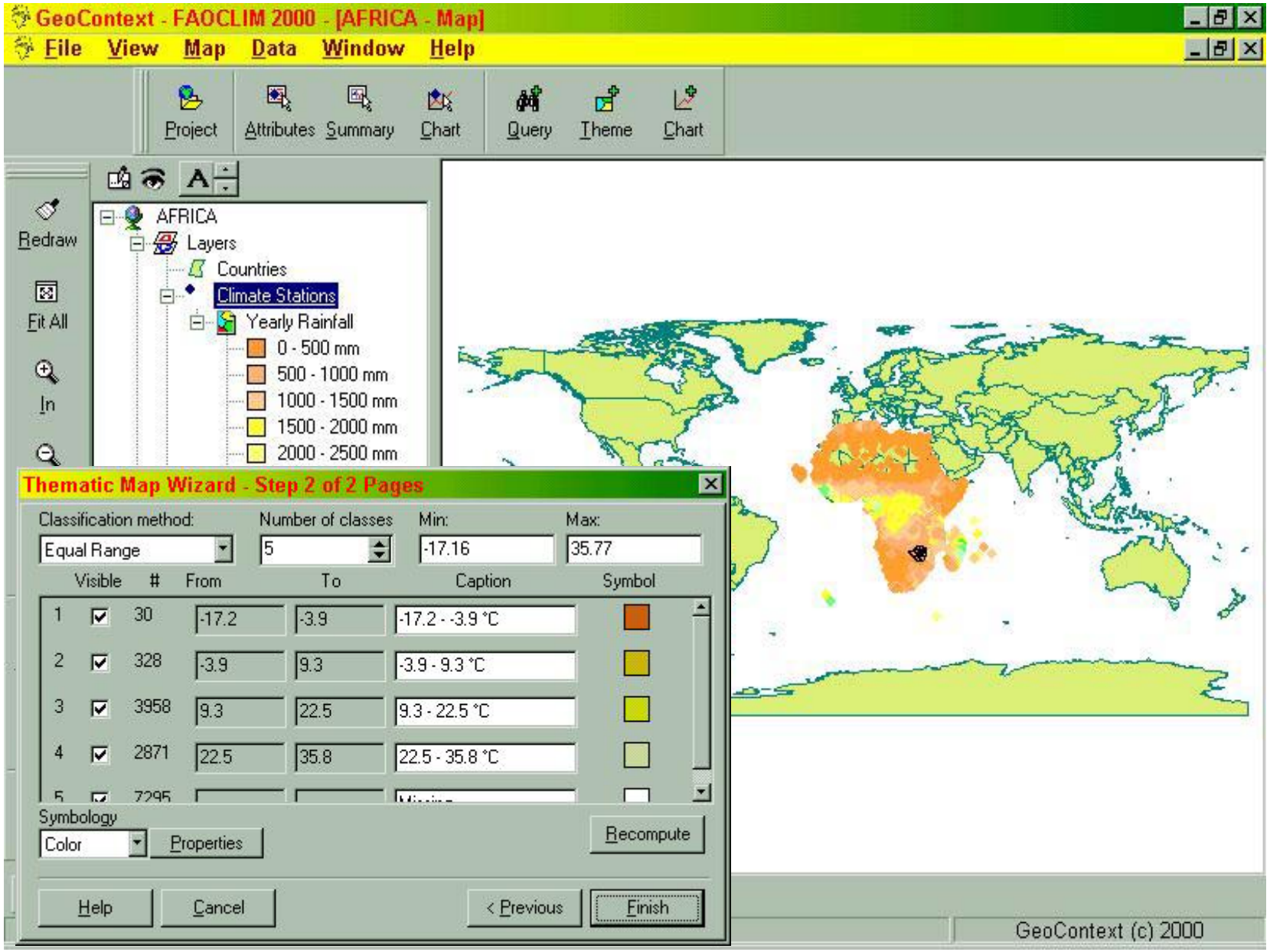
Min

FAOCLIM-2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Layers
Countries
Climate Stations
Yearly Rainfall
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1000 - 1500 mm
1500 - 2000 mm
2000 - 2500 mm
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Number of classes
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2 328 -3.9 9.3 -3.9 - 9.3 °C
3 3958 9.3 22.5 9.3 - 22.5 °C
4 2871 22.5 35.8 22.5 - 35.8 °C
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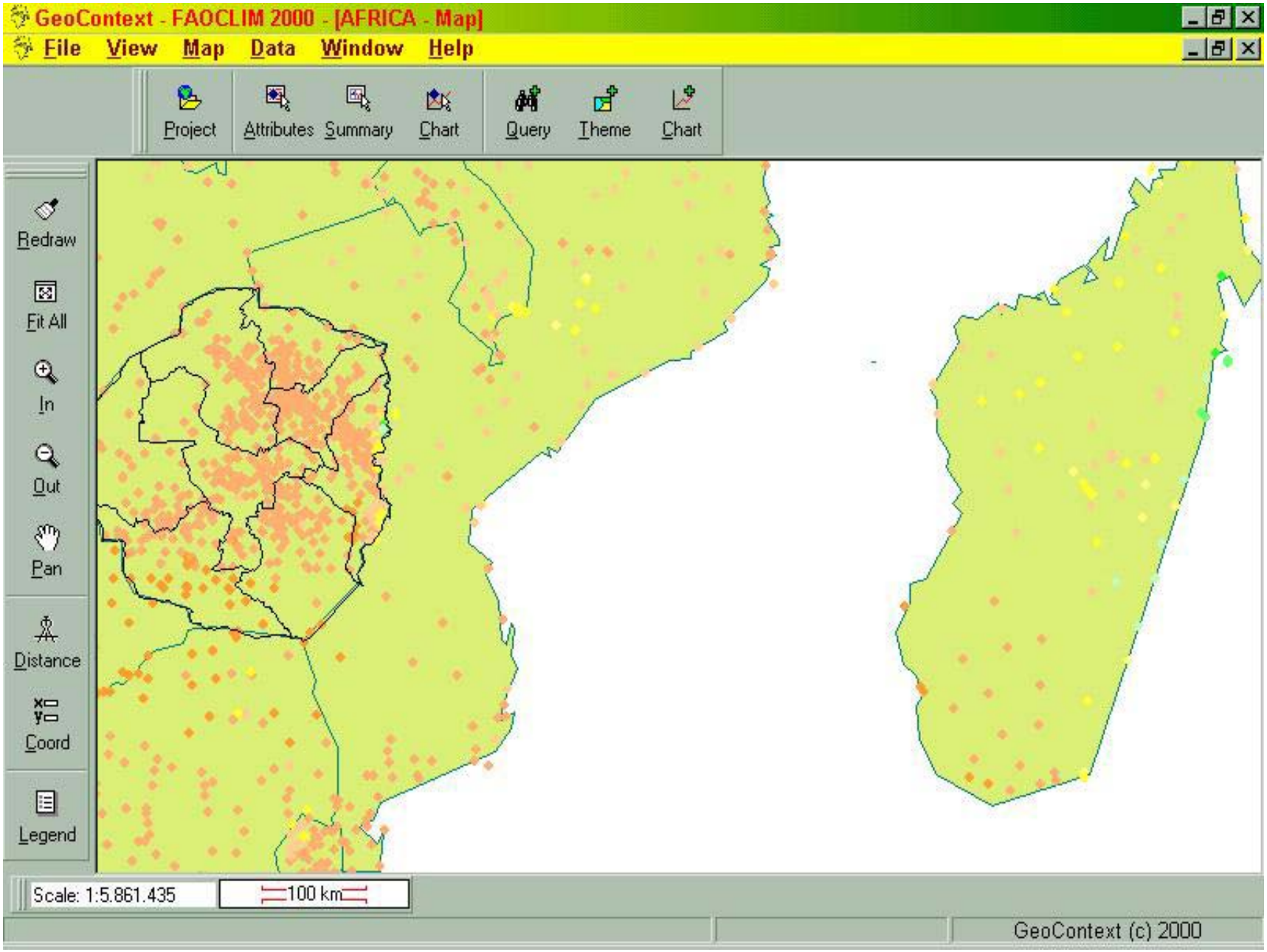
FAOCLIM-2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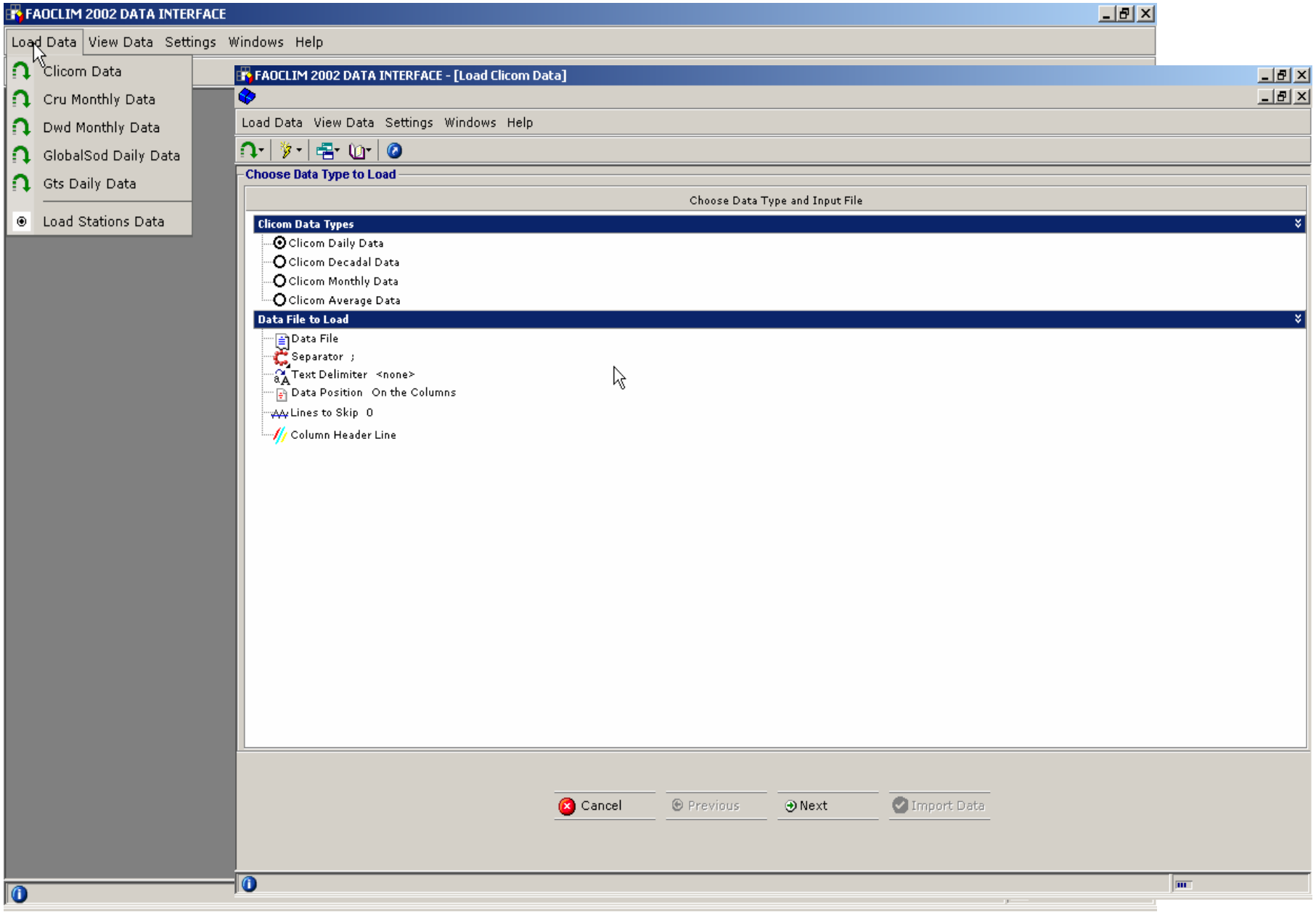
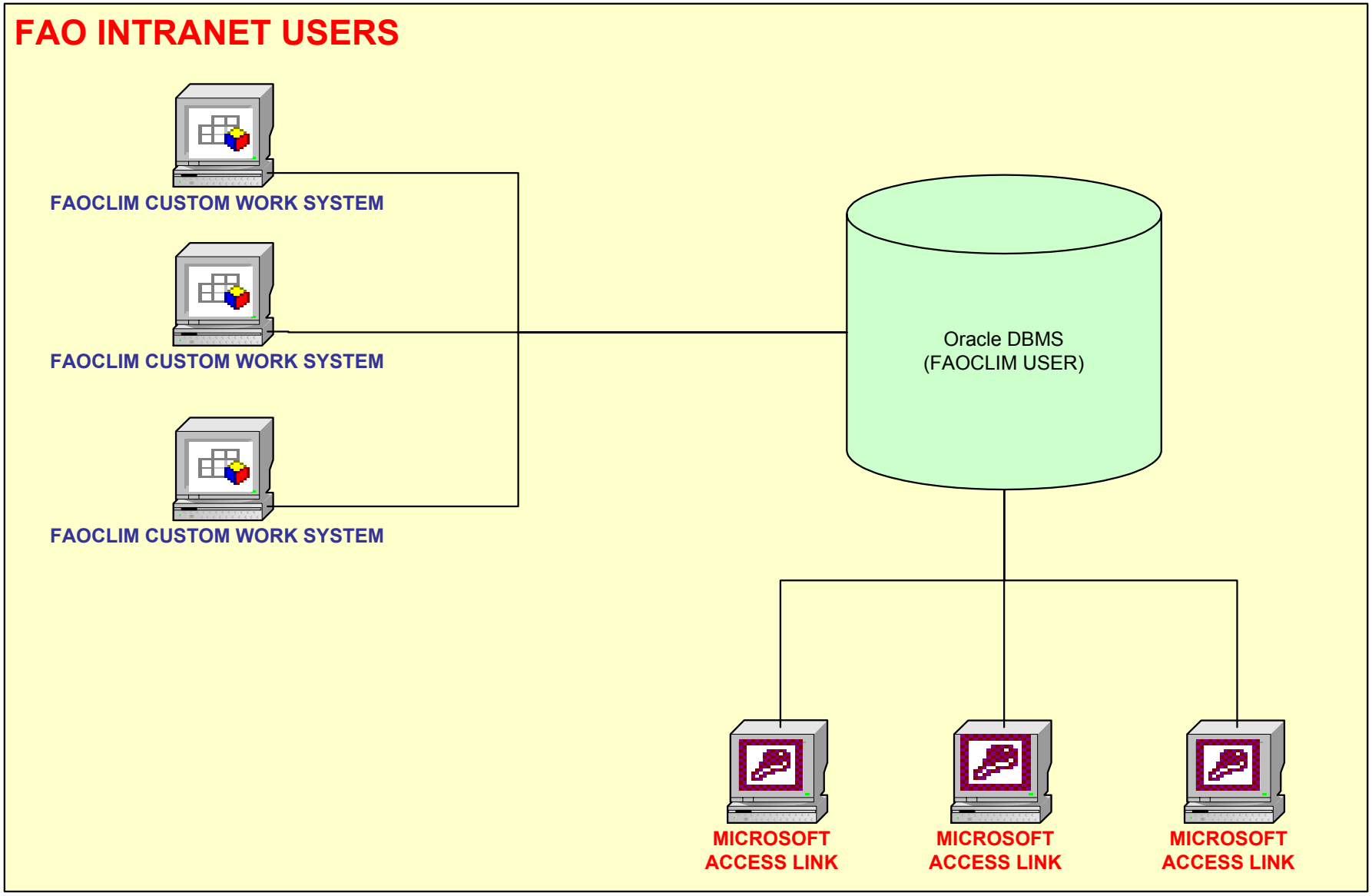
Redraw
Fit All
In
Out
Pan
Distance
Coord
Legend
Scale: 1:5.861.435
100 km
GeoContext (c) 2000

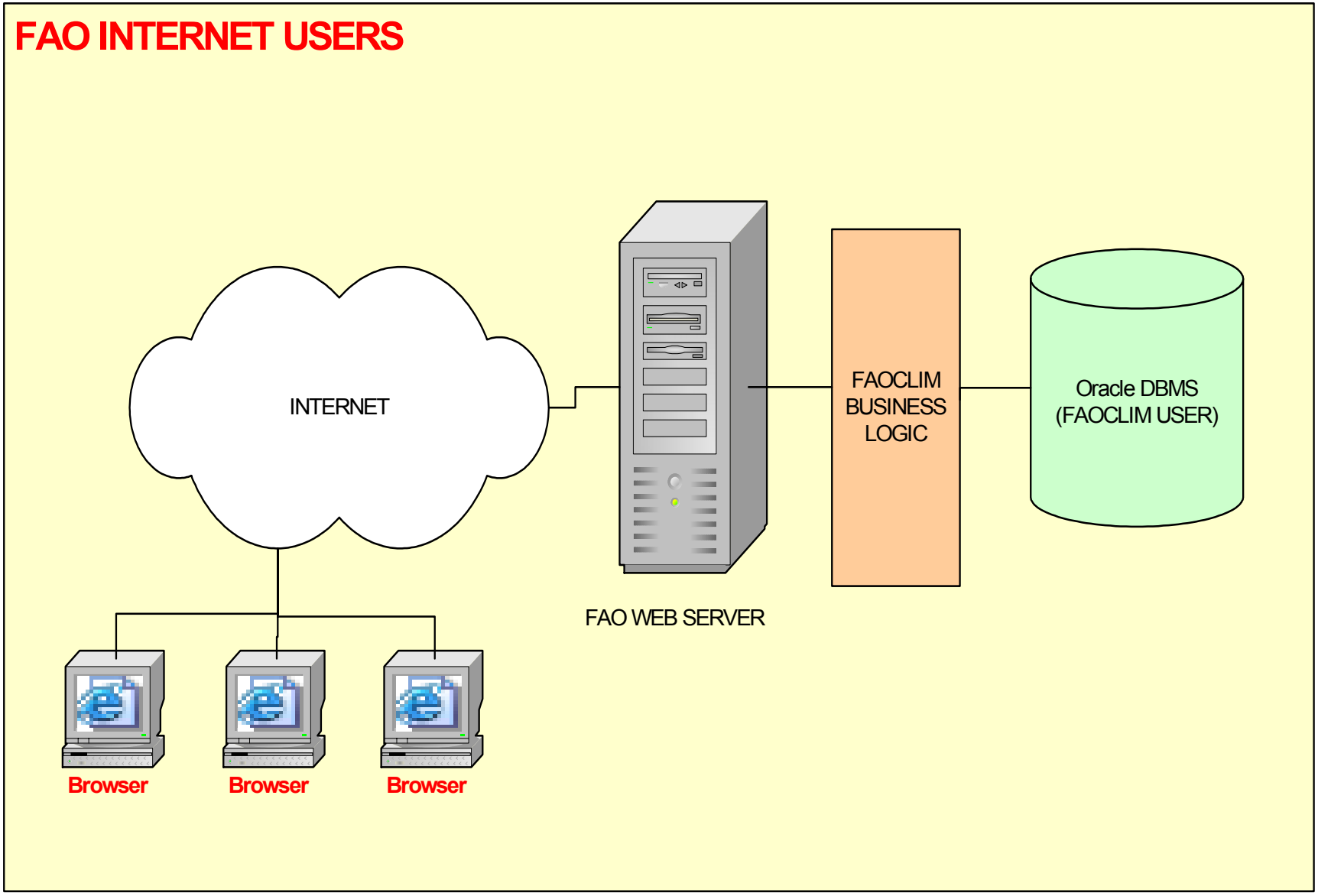
Faoclim2003



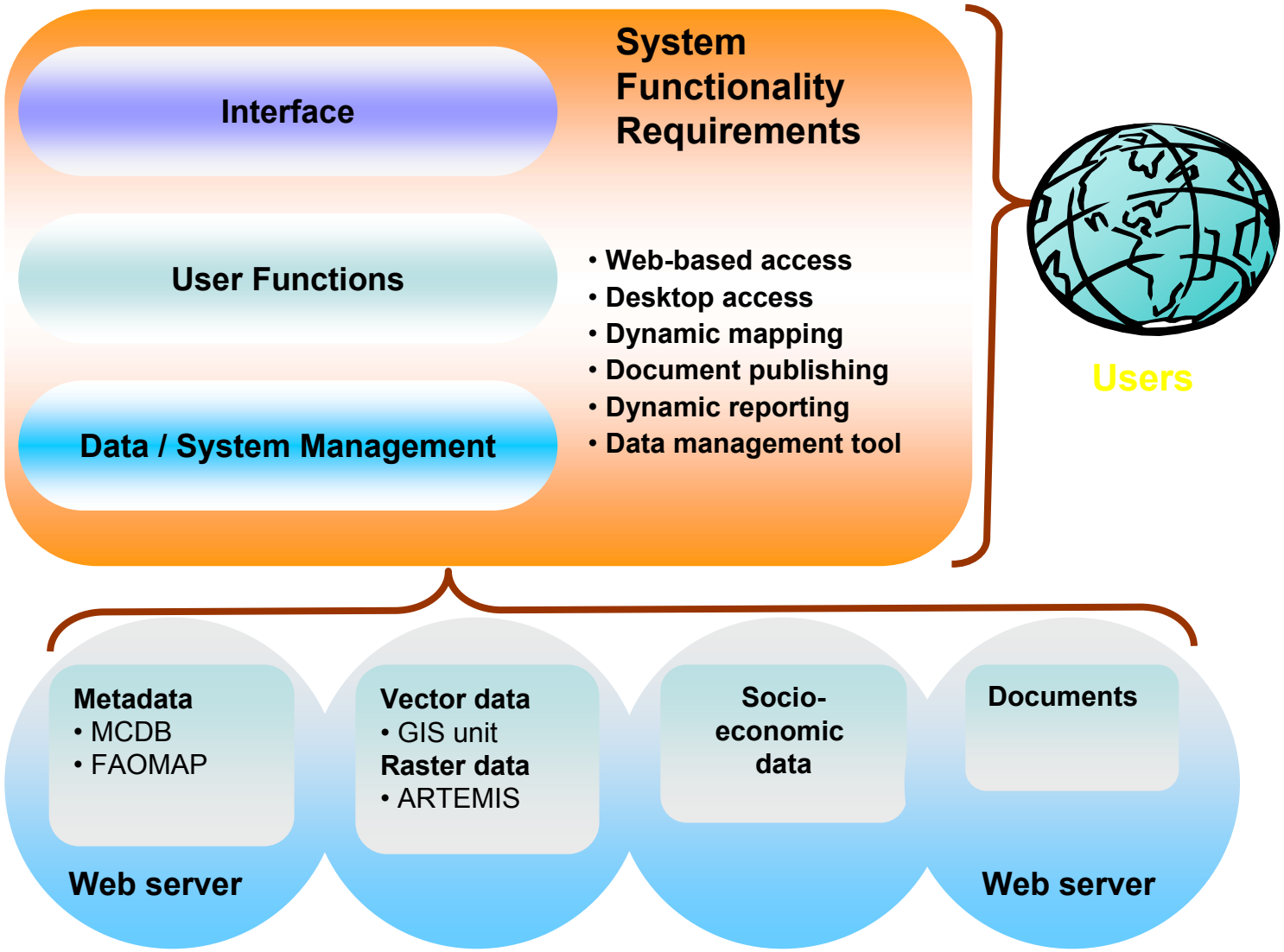
Faoclim2003



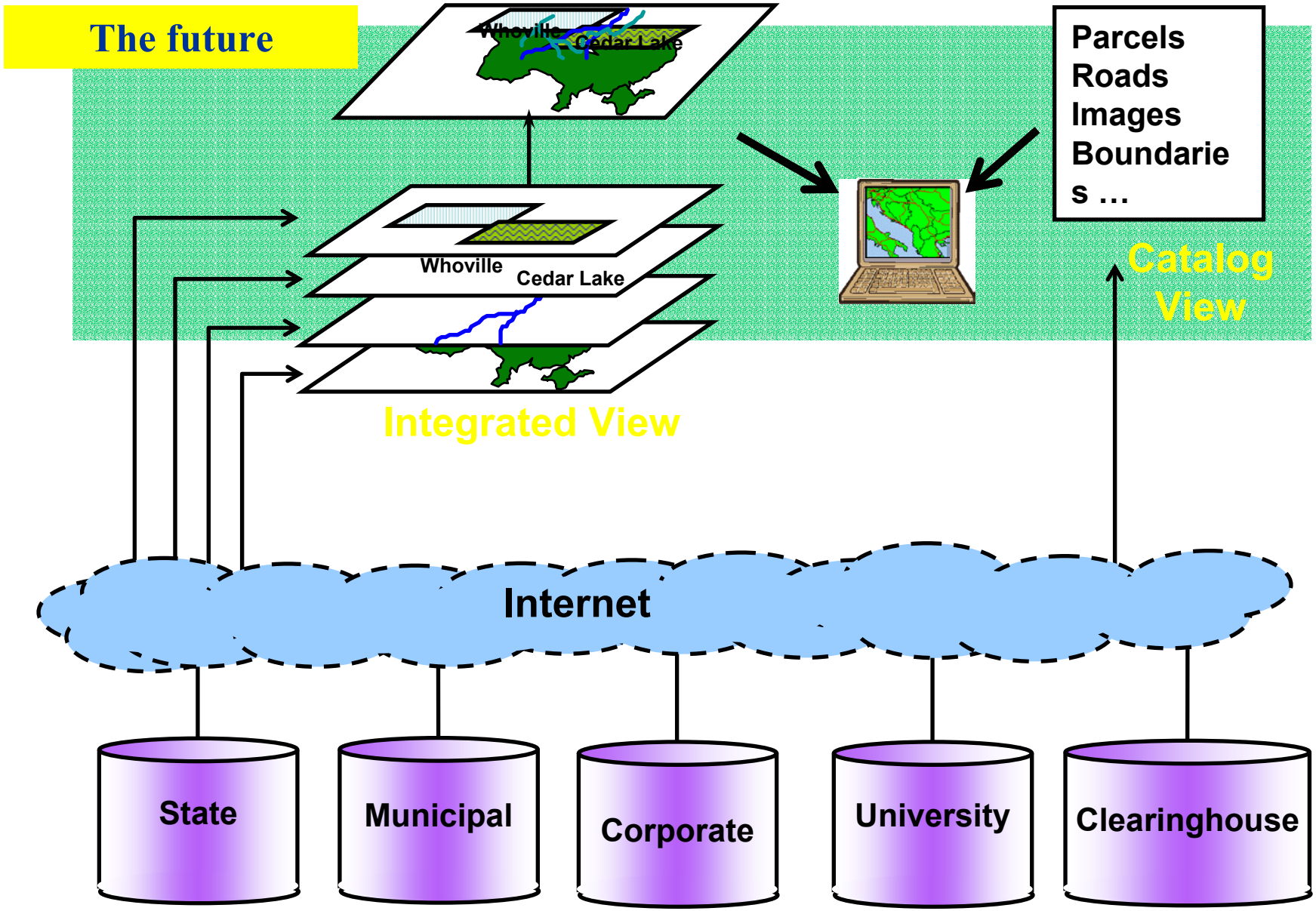
Faoclim2003



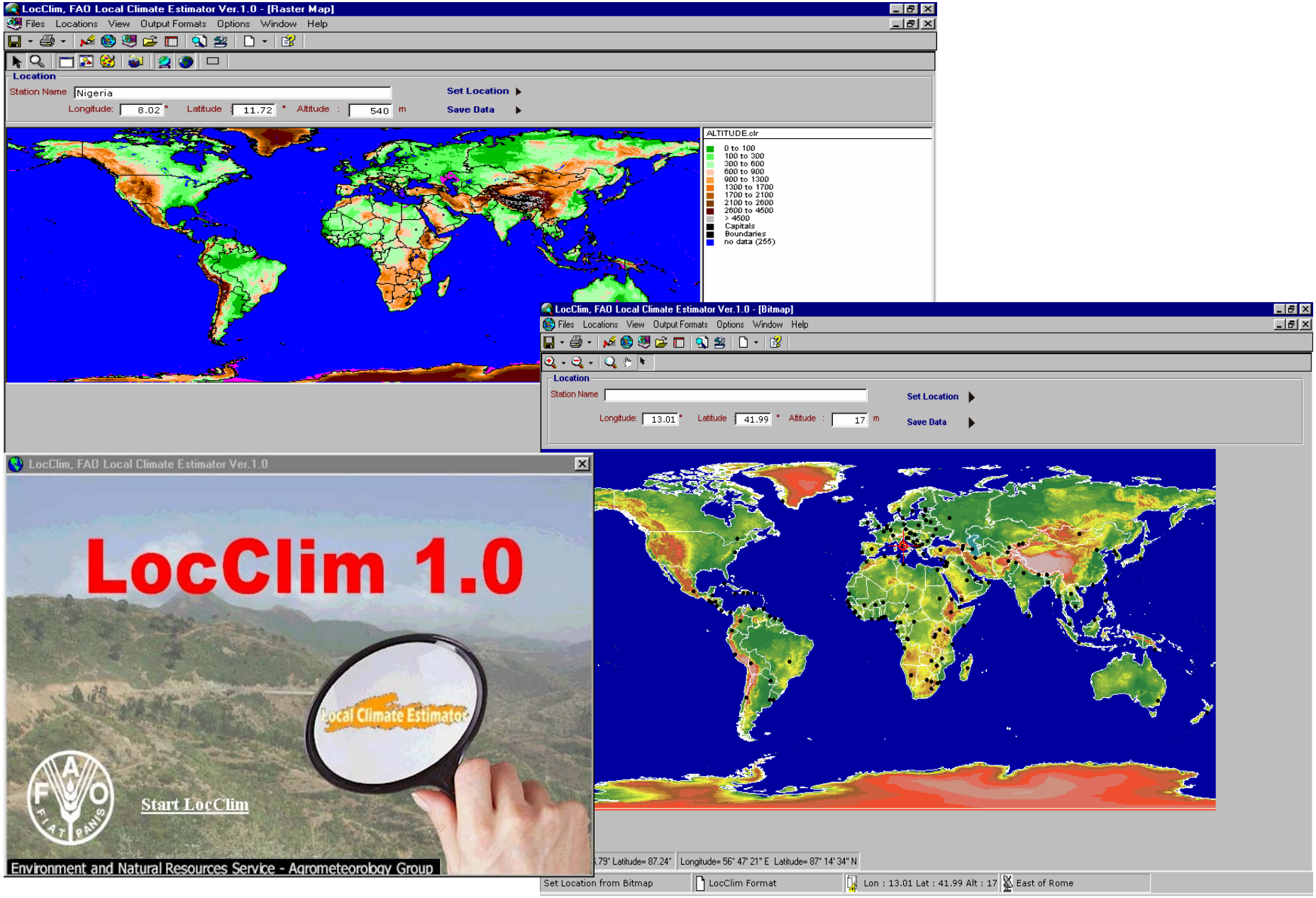
SDRN Geo-Network concept



SDRN Geo-Network concept



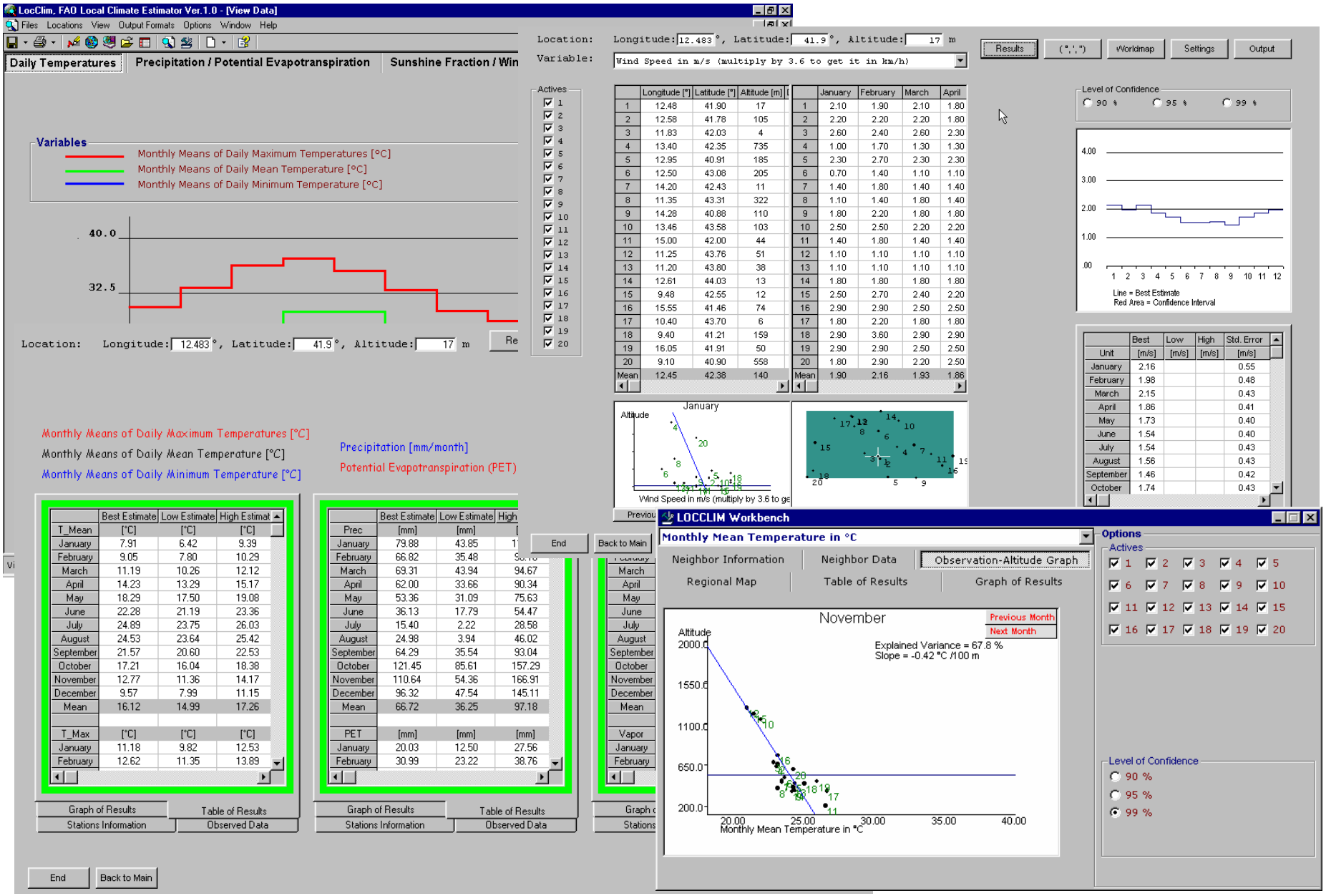
LocClim - Local Climate Estimator



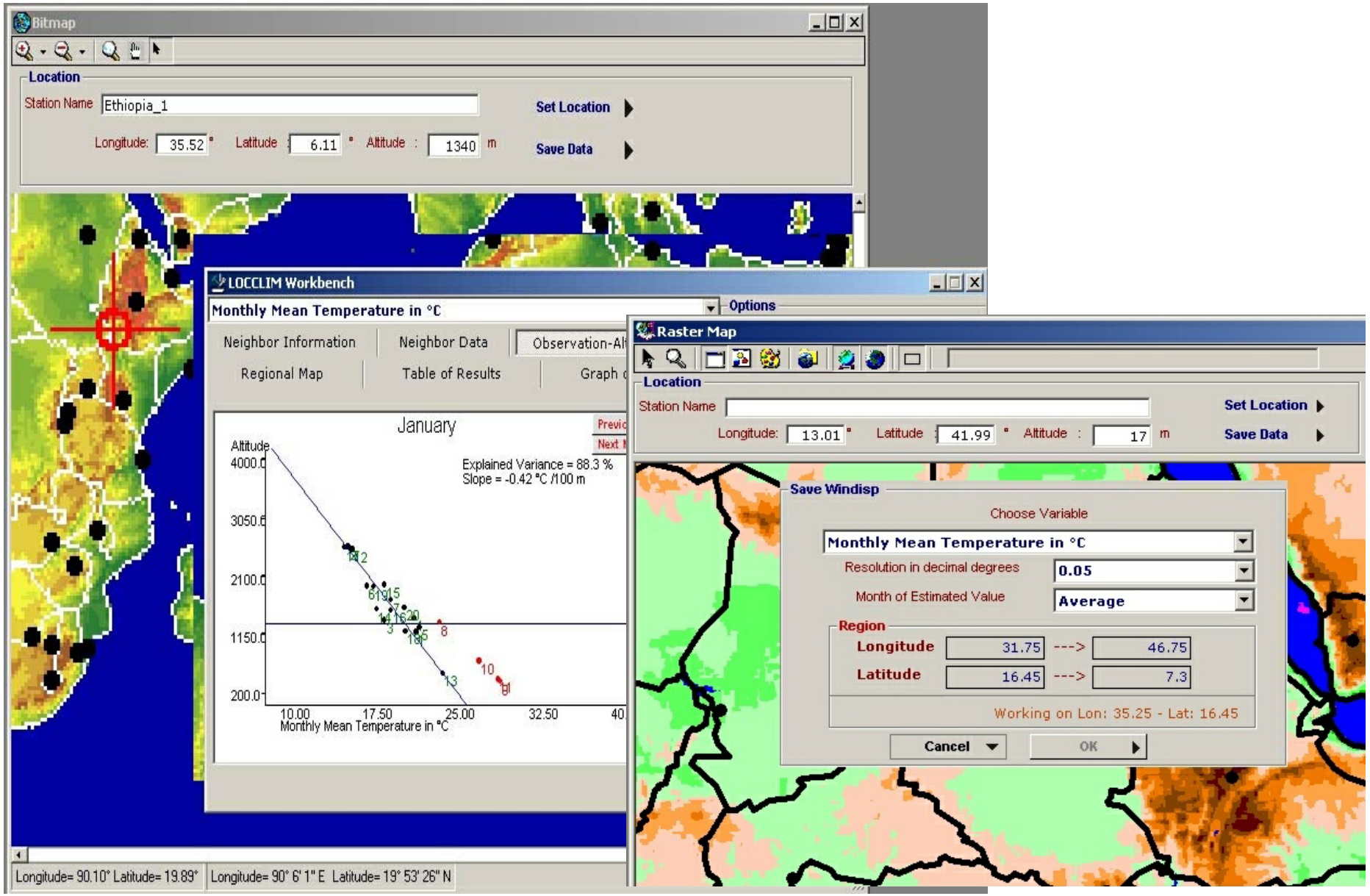
LocClim - Local Climate Estimator

- Estimation of local climatology based on FAOCLIM2 data
- Optimized database for fast access to "neighbors"
- Altitude and geographic gradient correction
- Final version with inverse distance and kriging
- Error estimation

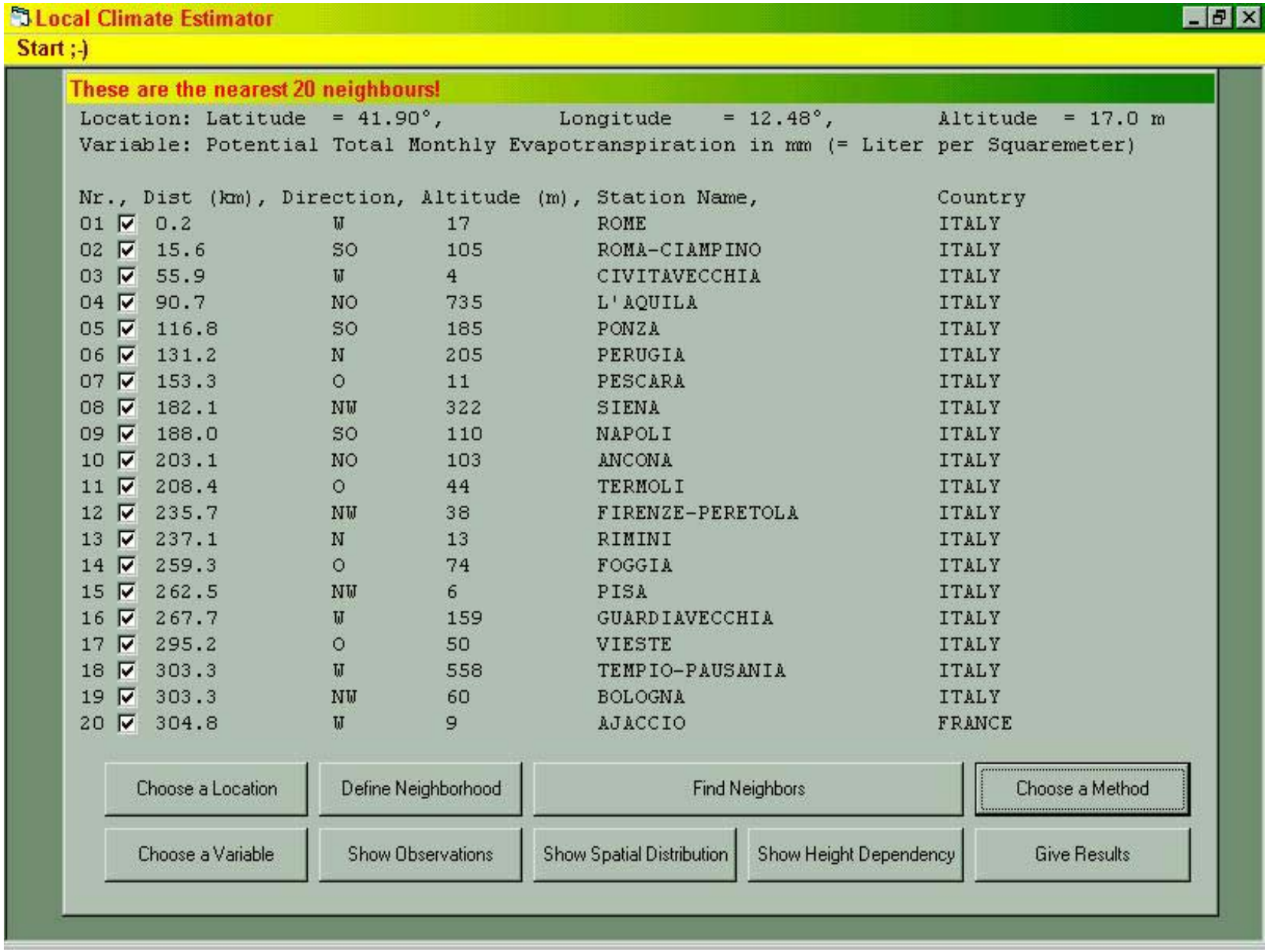
LocClim - Local Climate Estimator



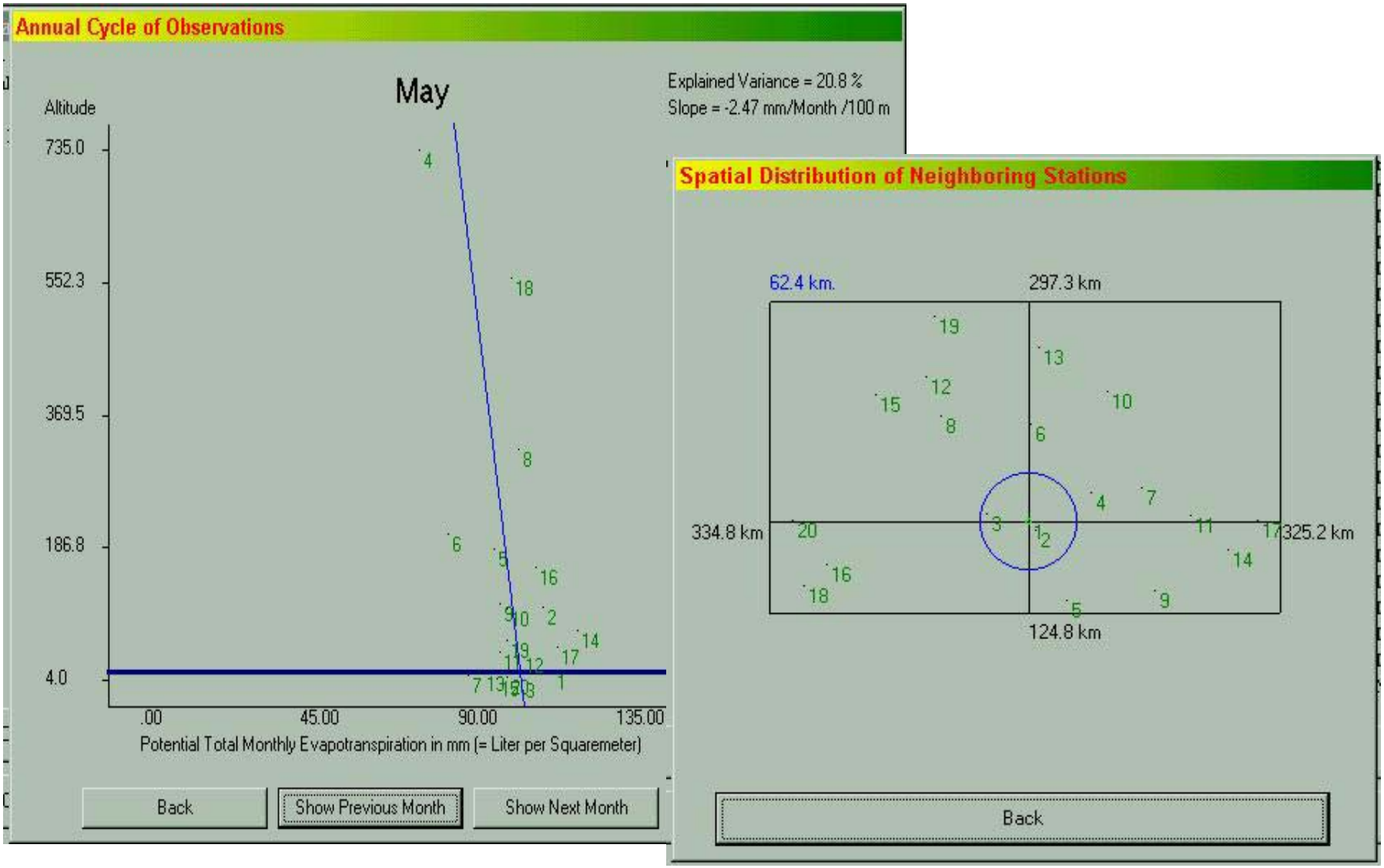
LocClim - Local Climate Estimator



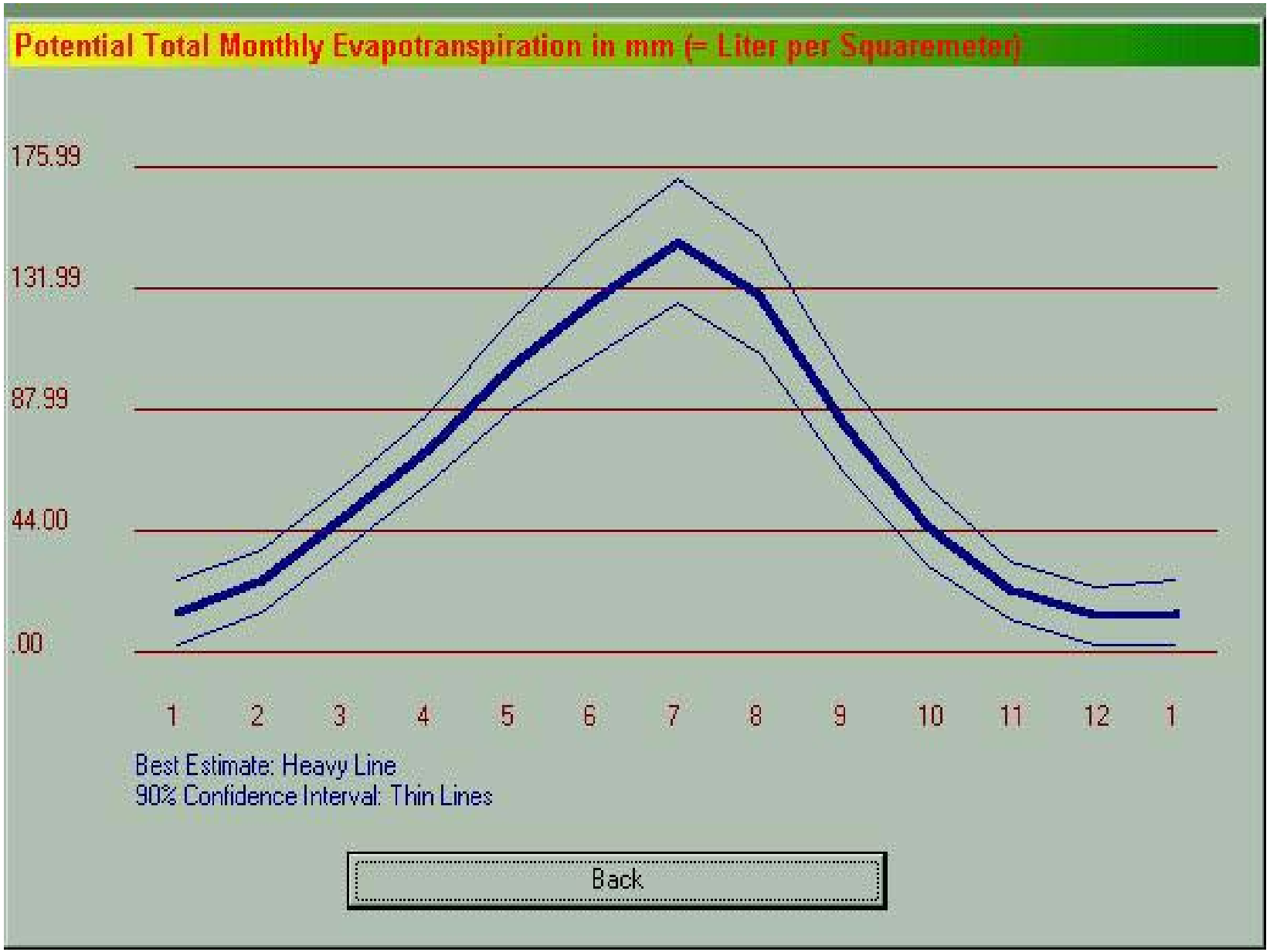
LocClim - Local Climate Estimator



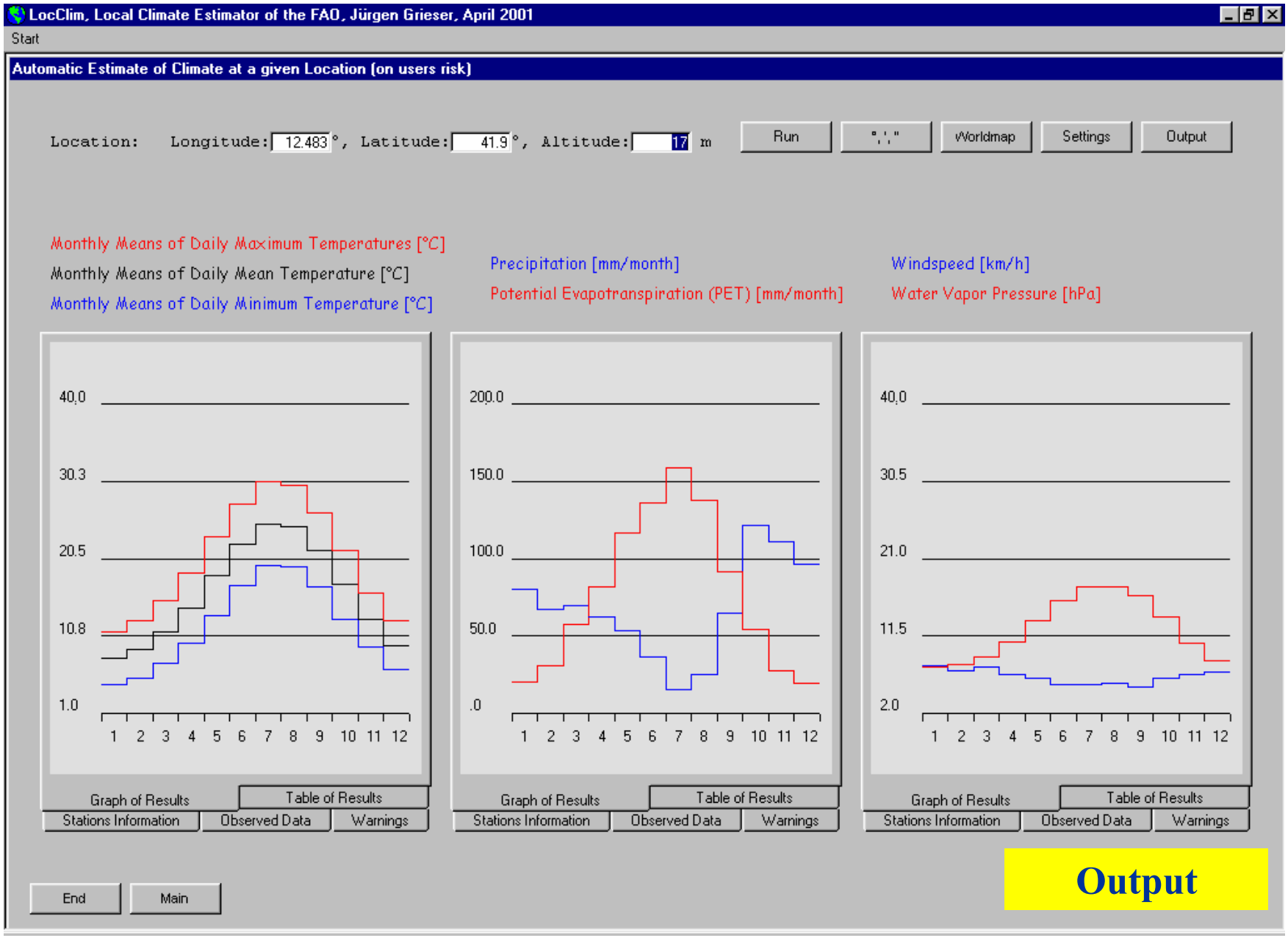
LocClim - Local Climate Estimator



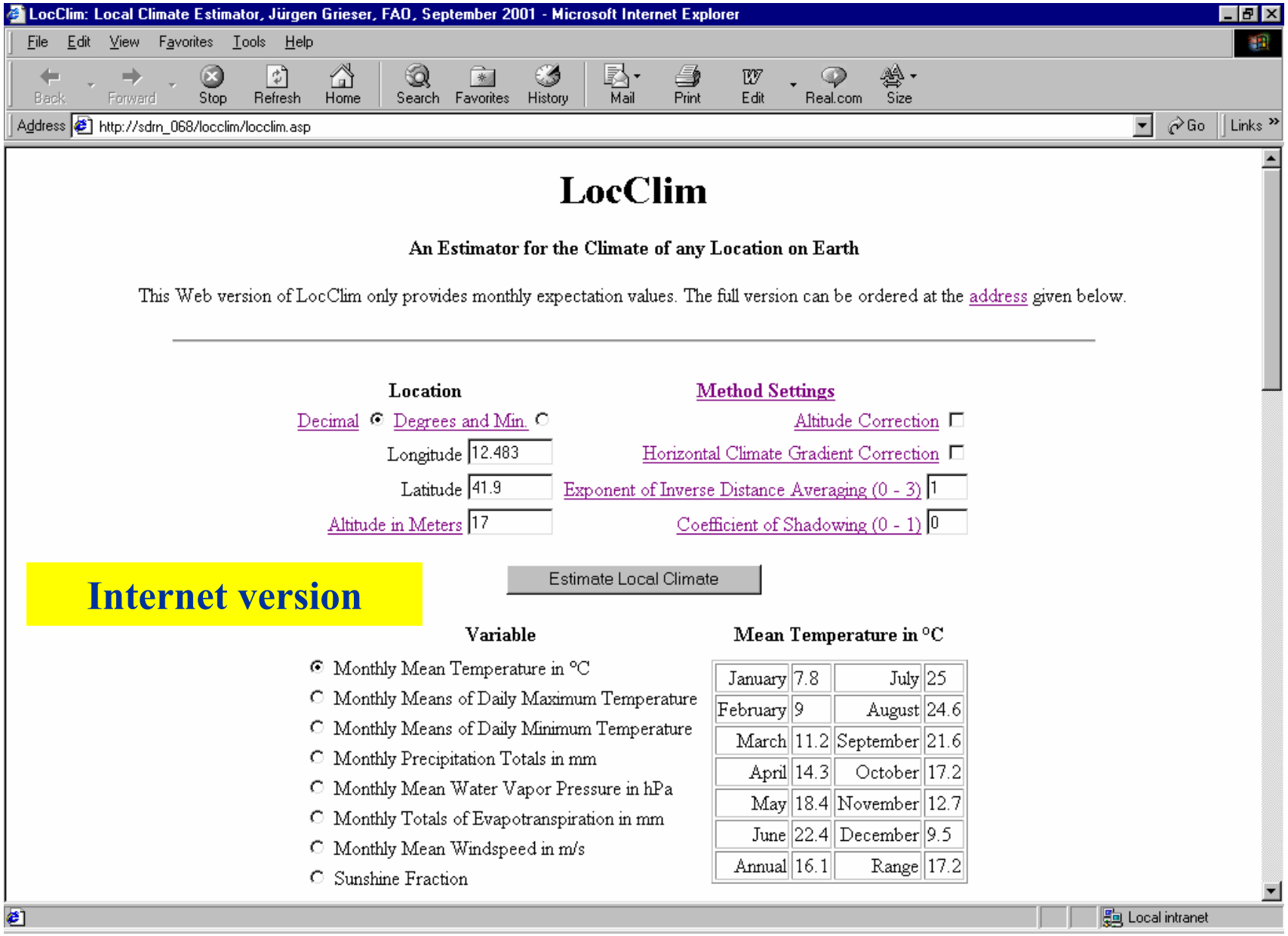
LocClim - Local Climate Estimator



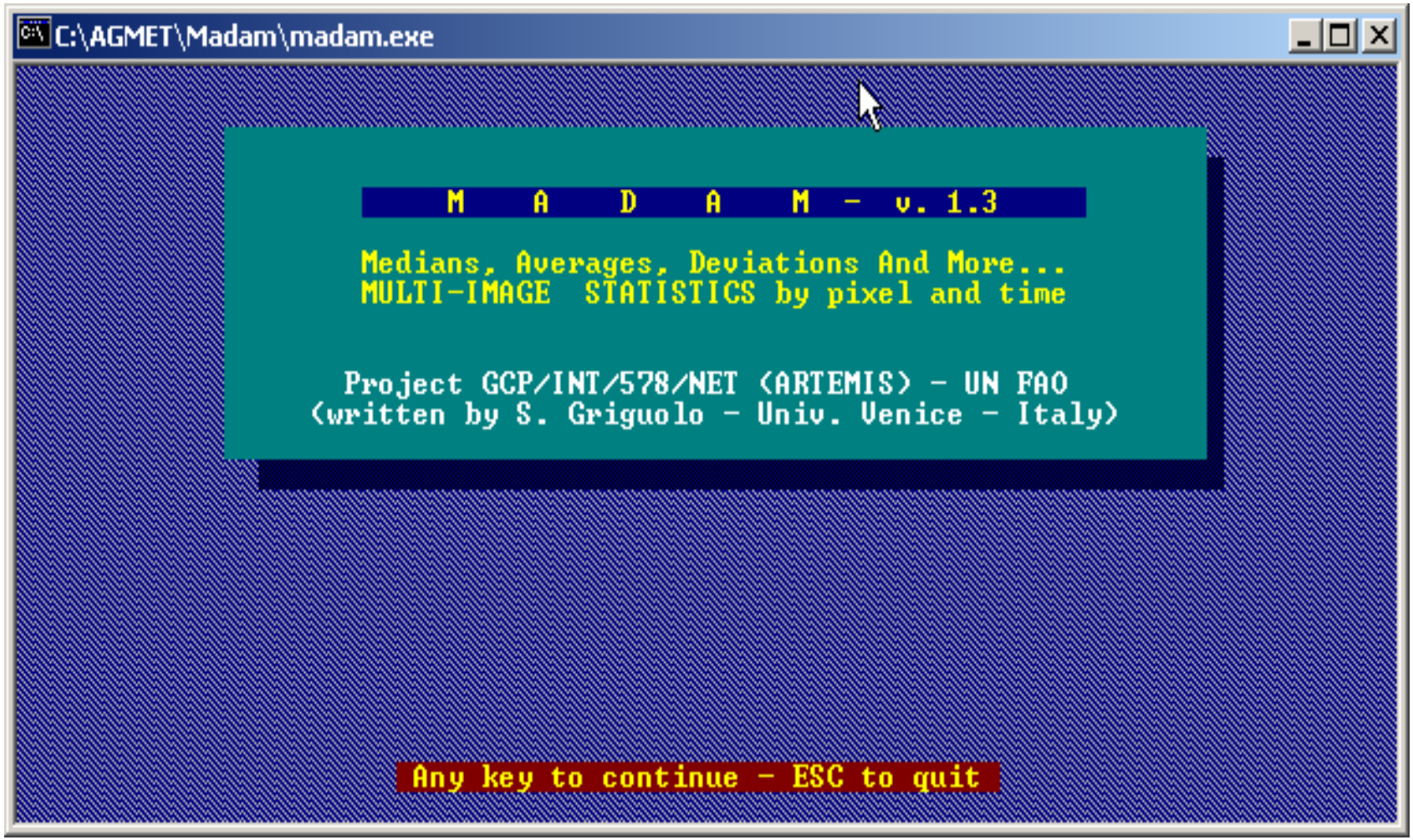
LocClim - Local Climate Estimator



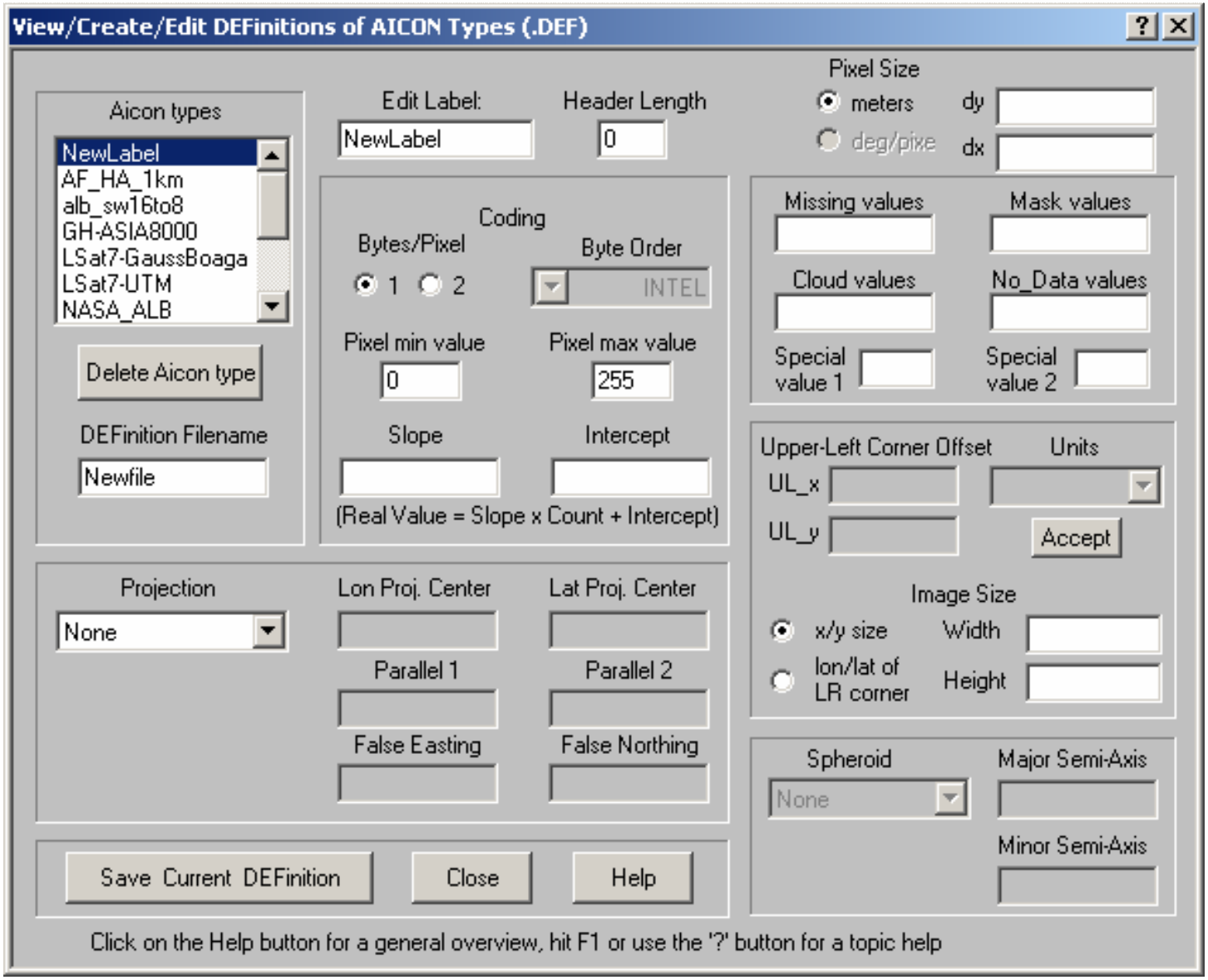
LocClim - Local Climate Estimator



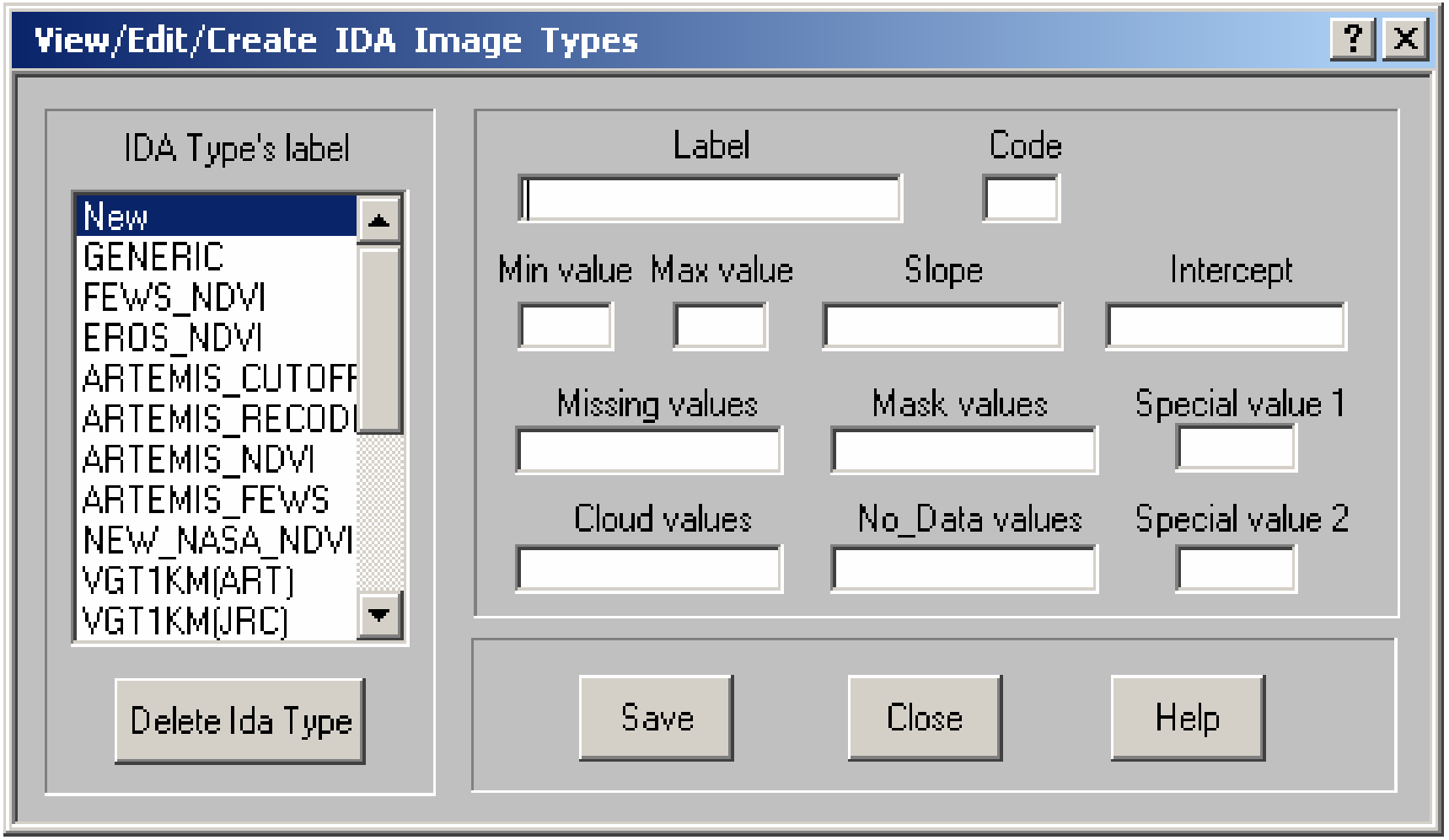
MADAM


C:\AGMET\Madam\madam.exe
M A D A M - v. 1.3
Medians, Averages, Deviations And More...
MULTI-IMAGE STATISTICS by pixel and time
Project GCP/INT/578/NET (ARTEMIS) - UN FAO
(written by S. Griguolo - Univ. Venice - Italy)
Any key to continue - ESC to quit

AICON


View/Create/Edit DEFinitions of AICON Types (.DEF)
Aicon types
NewLabel
AF_HA_1km
alb_sw16to8
GH-ASIA8000
LSat7-GaussBoaga
LSat7-UTM
NASA_ALB
Delete Aicon type
DEFinition Filename
Newfile
Edit Label:
NewLabel
Header Length
0
Pixel Size
meters
deg/pixe
dy
dx
Coding
Bytes/Pixel
1
2
Byte Order
INTEL
Pixel min value
0
Pixel max value
255
Slope
Intercept
(Real Value = Slope x Count + Intercept)
Missing values
Mask values
Cloud values
No_Data values
Special value 1
Special value 2
Upper-Left Corner Offset
Units
UL_x
UL_y
Accept
Image Size
x/y size
lon/lat of LR corner
Width
Height
Projection
None
Lon Proj. Center
Lat Proj. Center
Parallel 1
Parallel 2
False Easting
False Northing
Spheroid
None
Major Semi-Axis
Minor Semi-Axis
Save Current DEFinition
Close
Help
Click on the Help button for a general overview, hit F1 or use the '?' button for a topic help

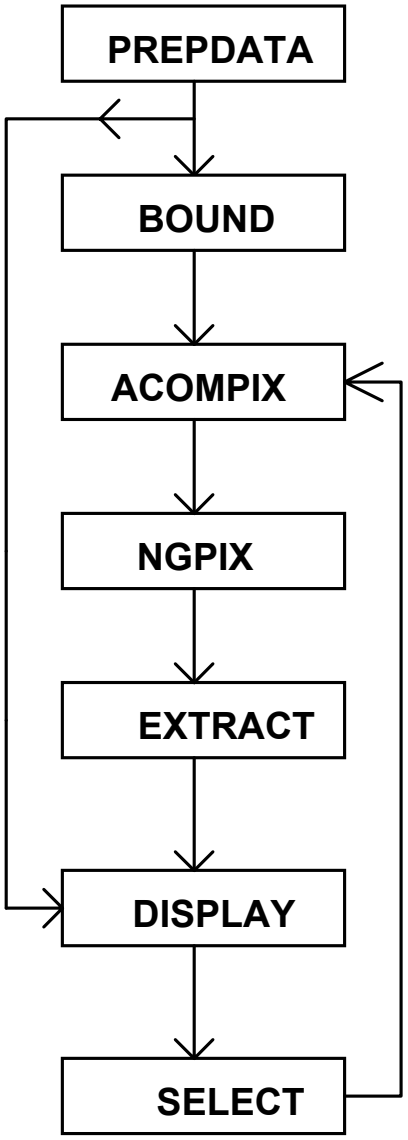
AICON


View/Edit/Create IDA Image Types
IDA Type's label
New
GENERIC
FEWS_NDVI
EROS_NDVI
ARTEMIS_CUTOFF
ARTEMIS_RECODI
ARTEMIS_NDVI
ARTEMIS_FEWS
NEW_NASA_NDVI
VGT1KM(ART)
VGT1KM(JRC)
Delete Ida Type
Label
Code
Min value
Max value
Slope
Intercept
Missing values
Mask values
Special value 1
Cloud values
No_Data values
Special value 2
Save
Close
Help

ADDAPIX


ADDAPIX.EXE
Addapix
A PACKAGE FOR ANALYSING, CLASSIFYING AND DISPLAYING
A SET OF IMAGES PIXEL-BY-PIXEL
Version 2.05 - Sep 30, 2002
Conceived by S. Griguolo and written with M. Mazzanti - Venice (Italy)
Support received from Project GCP/INT/578/NET (ARTEMIS) of the UN
Food and Agriculture Organization (FAO) is gratefully acknowledged
Contacts: silvio@cidoc.iuav.unive.it (Silvio Griguolo)
fred.snijders@fao.org (Fred Snijders)
Any key to continue

ADDAPIX



Merges suitably a temporal sequence of images

(optional) selects the region(s) to which to restrict the clustering procedure

Principal Components Analysis of the table pixels x time variables

Non-hierarchical Clustering of Pixels

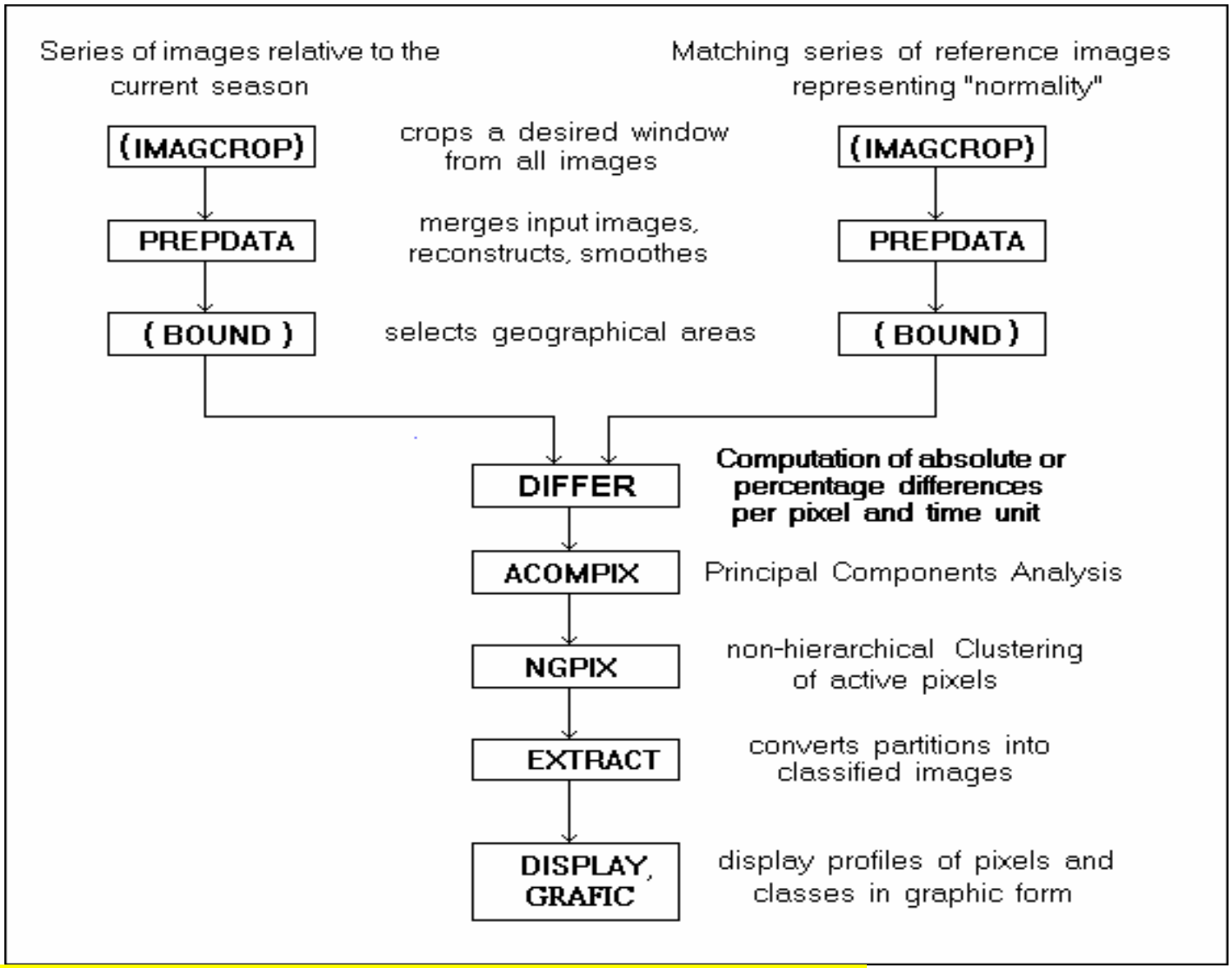
Converts any partition computed by NGPIX into a classified image for DISPLAY

Displays profiles of pixels and classes in graphic form

Selects only pixels belonging to some classes for further processing

Program chaining for zoning mode

ADDAPIX



Program chaining for monitoring mode

ADDAPIX

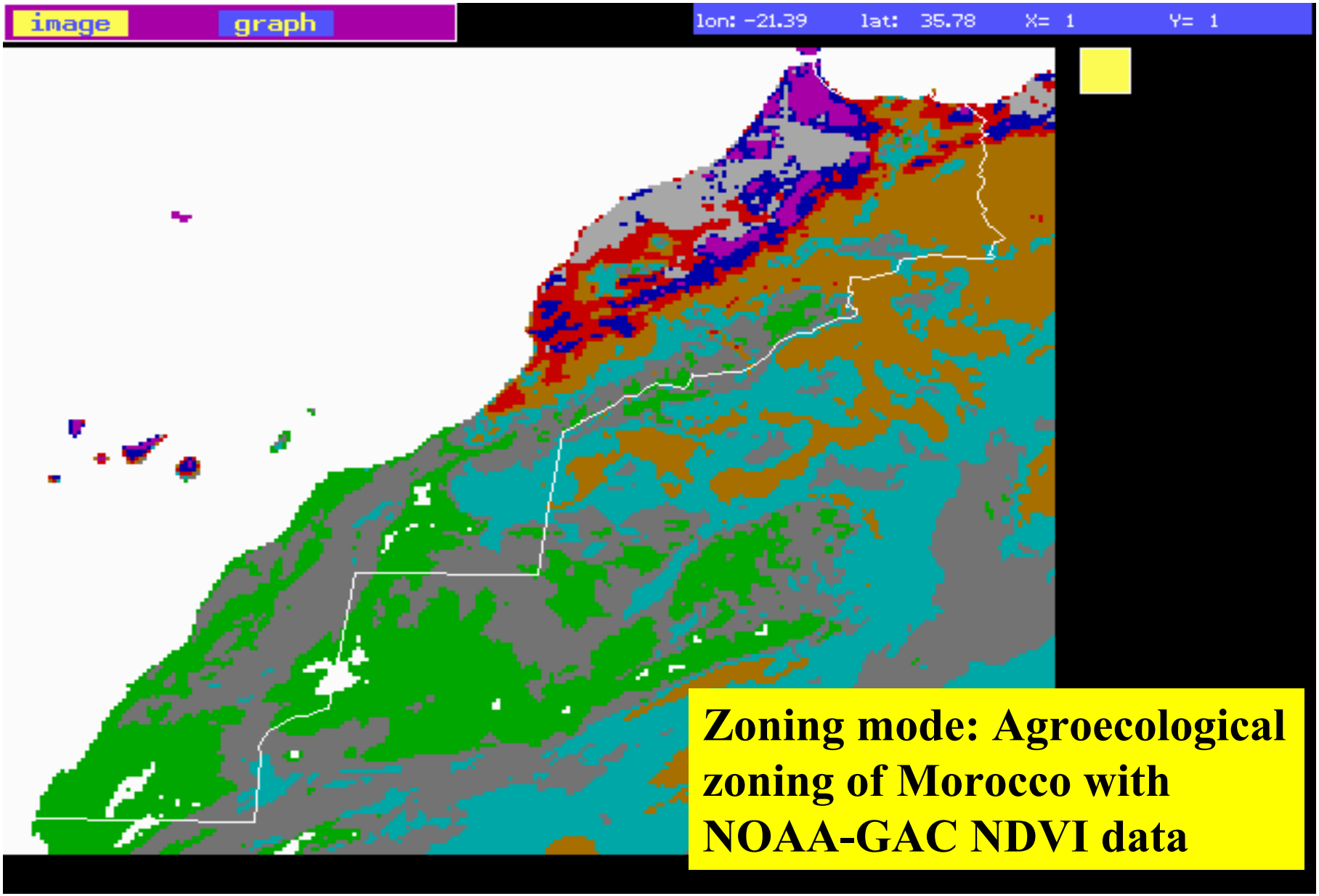
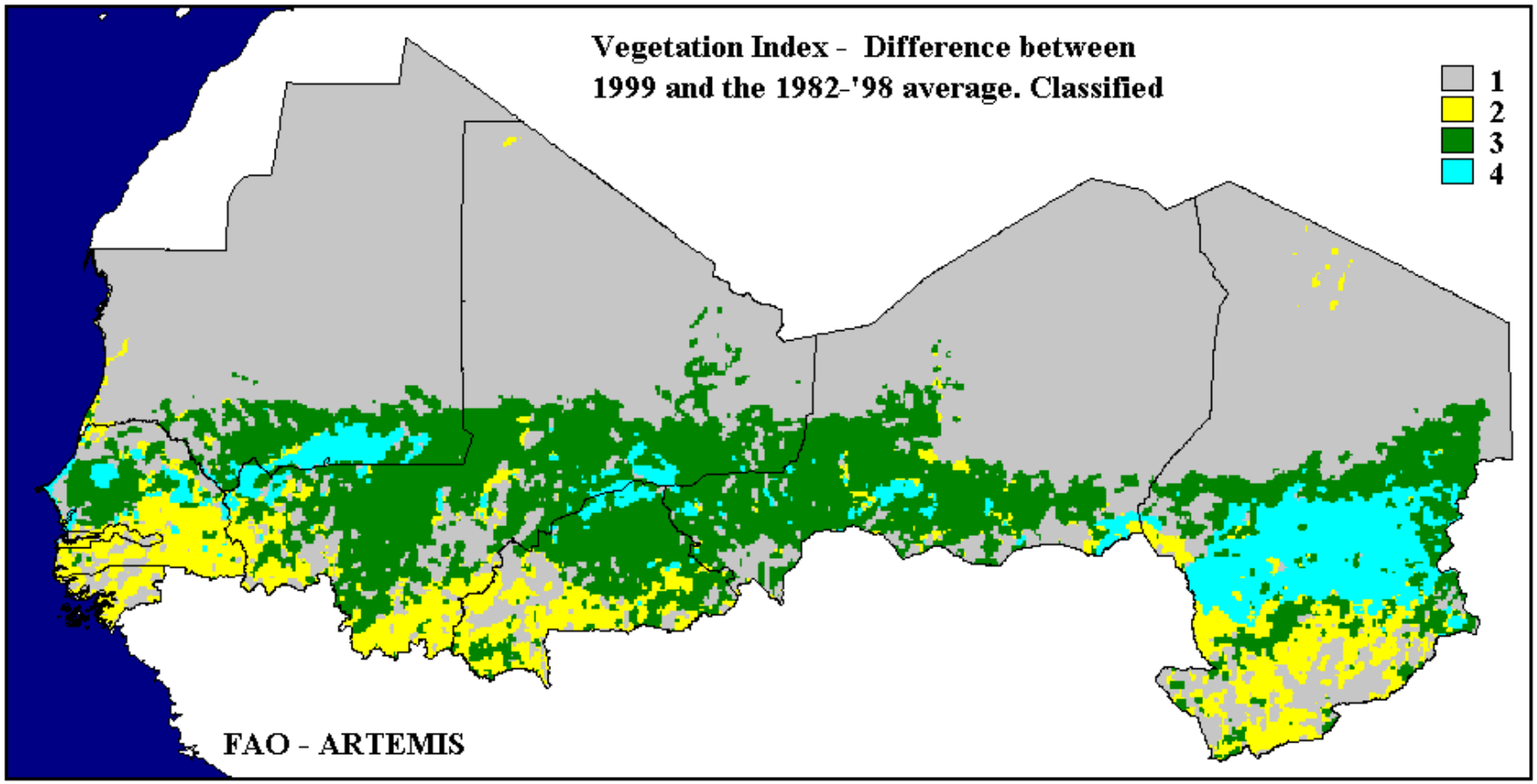


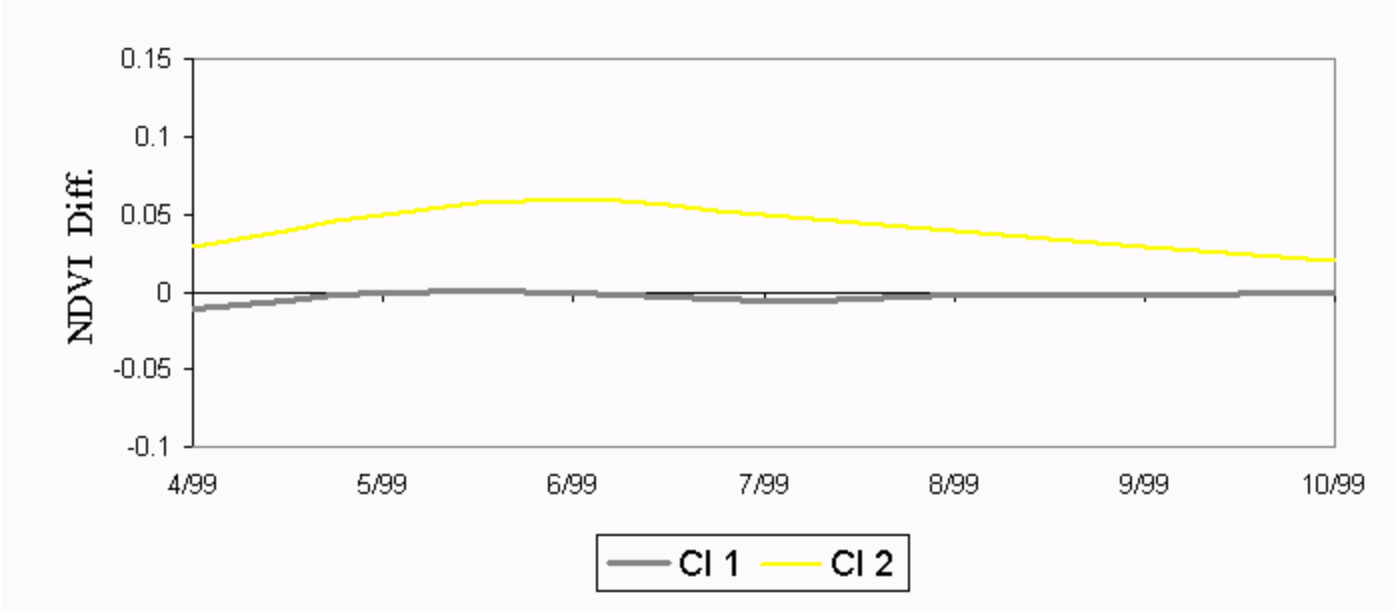
image
graph
lon: -21.39
lat: 35.78
X= 1
Y= 1
Zoning mode: Agroecological zoning of Morocco with NOAA-GAC NDVI data

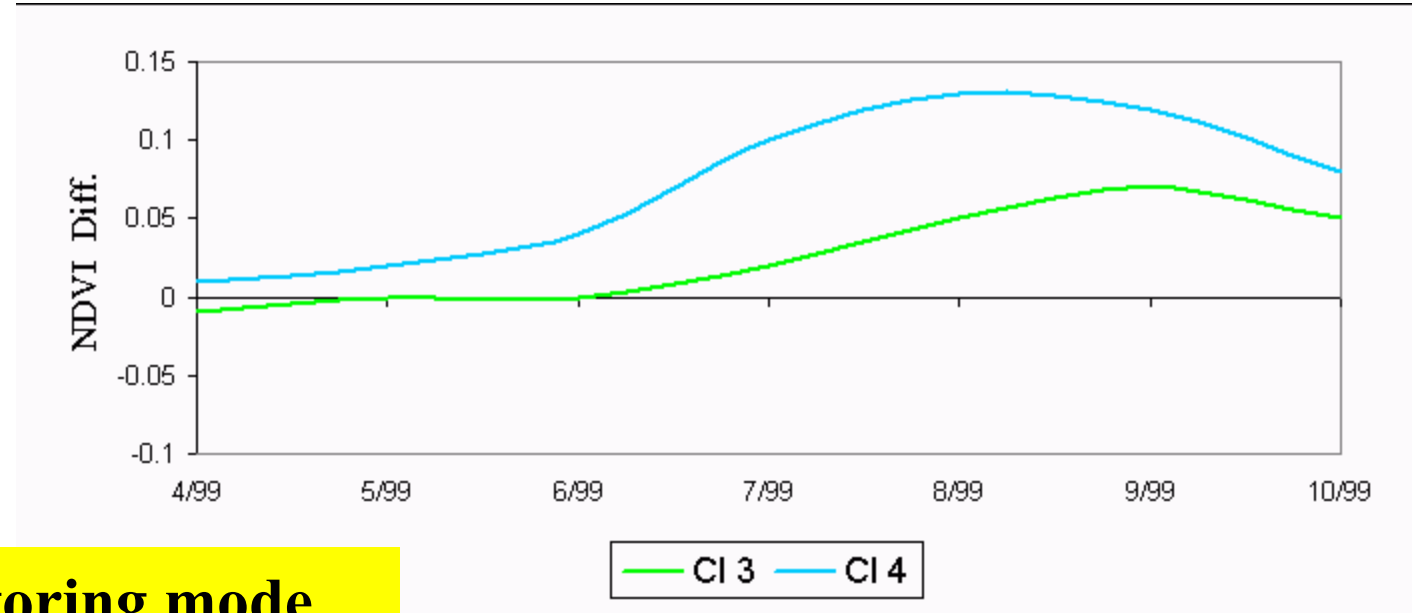
ADDAPIX



Monitoring mode: Assessment of 1999 Cereal Production in Western Africa with NOAA-GAC NDVI data

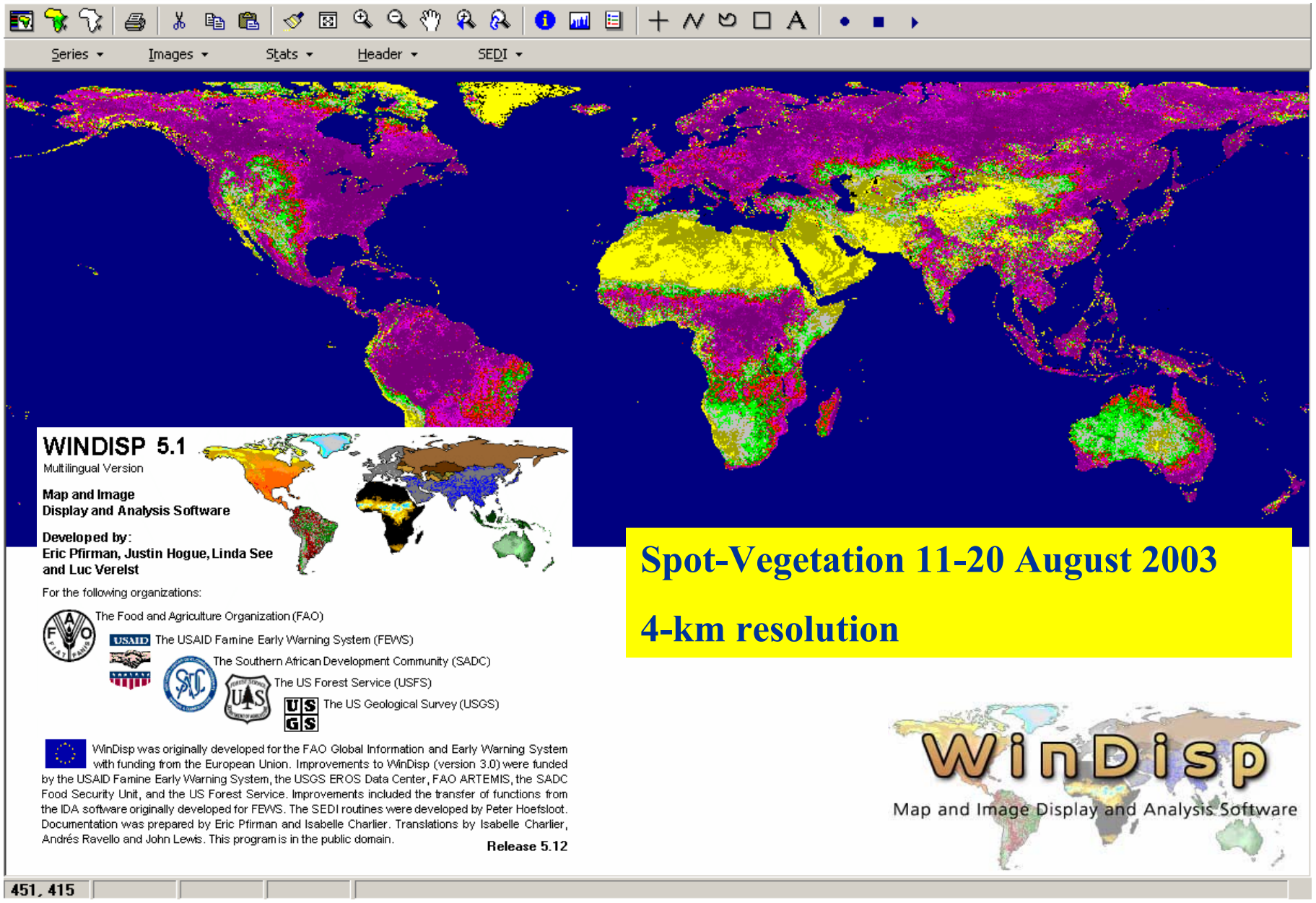
ADDAPIX



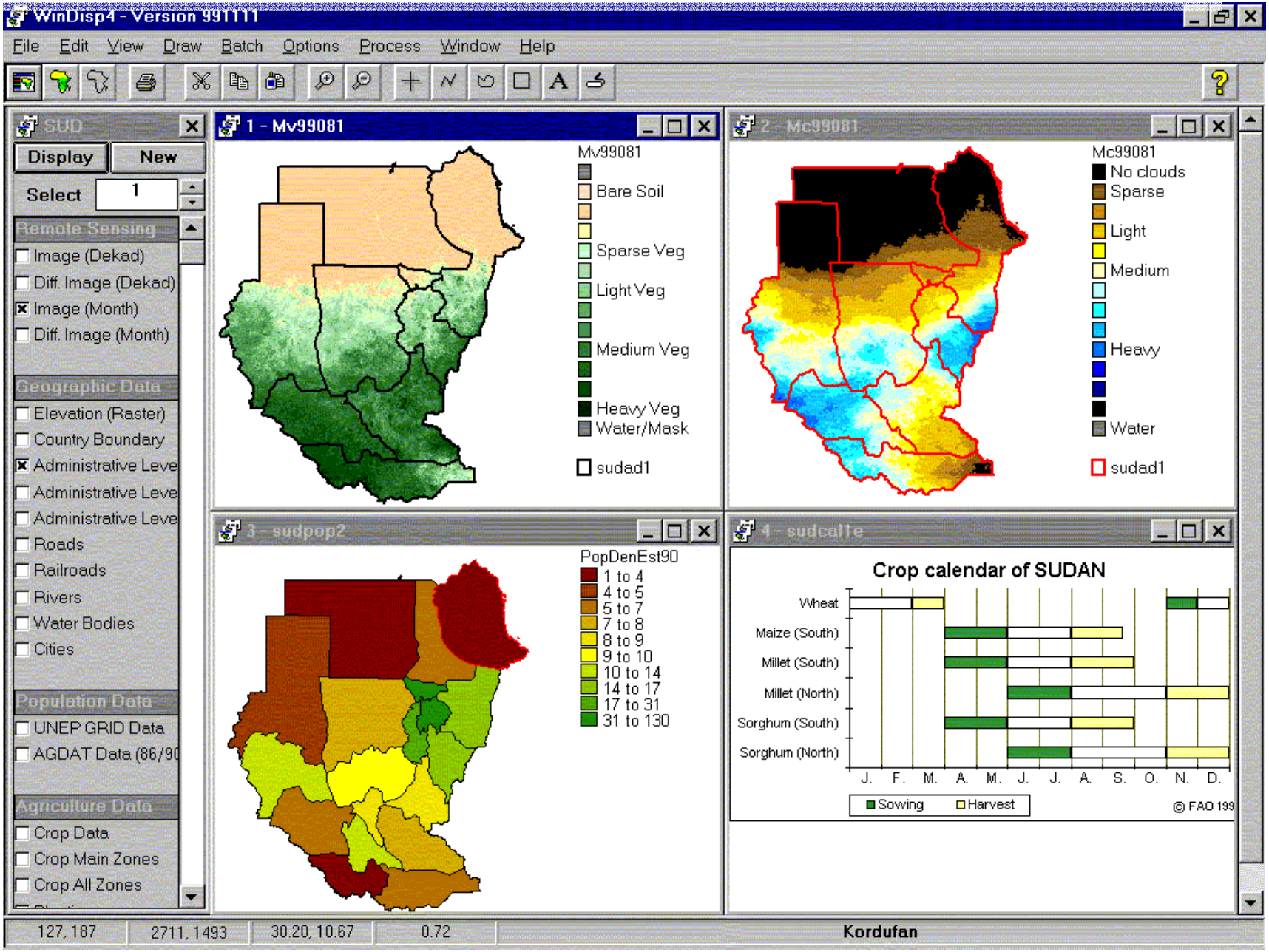


Monitoring mode

WinDisp - Display and analysis tool



WinDisp - Display and analysis tool



VAST

V.A.S.T.3 - Vegetation Analysis in Space and Time - 3
Version 3.0, September 1994
Written by Felix F. Lee

Usage:
VAST3 <cc> <yr> [inpath] [outpath] [ext] [st_mon] [ed_mon] [pbase] [ptol]

cc = 2 character country code (e.g. ML, CH)
yr = 2 digit year (e.g. 82, 88, 92)
inpath = up to 15 characters input data path (full path)
outpath = up to 15 characters output data path (full path)
ext = up to 3 characters file extension (e.g. IMG, SNI)
st_mon = starting month; the first dekad of this is used.
ed_mon = ending month; the third dekad of this is used.
pbase = base NDVI count unit value for starting date
ptol = minimum NDVI increase used in starting date calculations
< > = required parameters [ ] = optional parameters.

Example: VAST3 ML 82 C:\TEMP C:\OUT
Default Values: pbase = 107 ptol = 5 st_mon = 4 ed_mon = 11 ext = IMG

VAST

PBASE (default 107 on the 0-255 scale) corresponds to an NDVI value of 0.098.
It is meant to exclude spurious increases in NDVI when there is no effective vegetation on the ground. Santacroce uses 0.12.

PTOL is the tolerance used to decide if a rising trend can be declared the start of the season. If, from a given dekad, during the time interval t to t+2, at least two steps increase by at least PTOL, and there is no decreasing step, then t is declared the beginning of the season and decome SDAT, the stating date.

VAST

OUTPUTS

SDAT = the starting dekad

PEAK = the dekad at which NDVI peaks

HORZ = PEAK - SDAT

SVAL = the value of NDVI at SDAT

PVAL = the value of NDVI at time PEAK

VERT = PVAL - SVAL

EVAL = the NDVI at time PEAK + 4

DROP = PVAL - EVAL

SLOP = the slope of the line joining (SDAT,SVAL) to (PEAK,PVAL)

CUMM = the sum of NDVI values from SDAT to PEAK

SKEW = the ratio between the sum of the three NDVI values after PEAK (peak+1 to peak+3) and the sum of the seven values from Peak-3 to peak+3....

SMIDA

- DOS program
- Series of digital images
- Temporal interpolation of missing values

CropWat

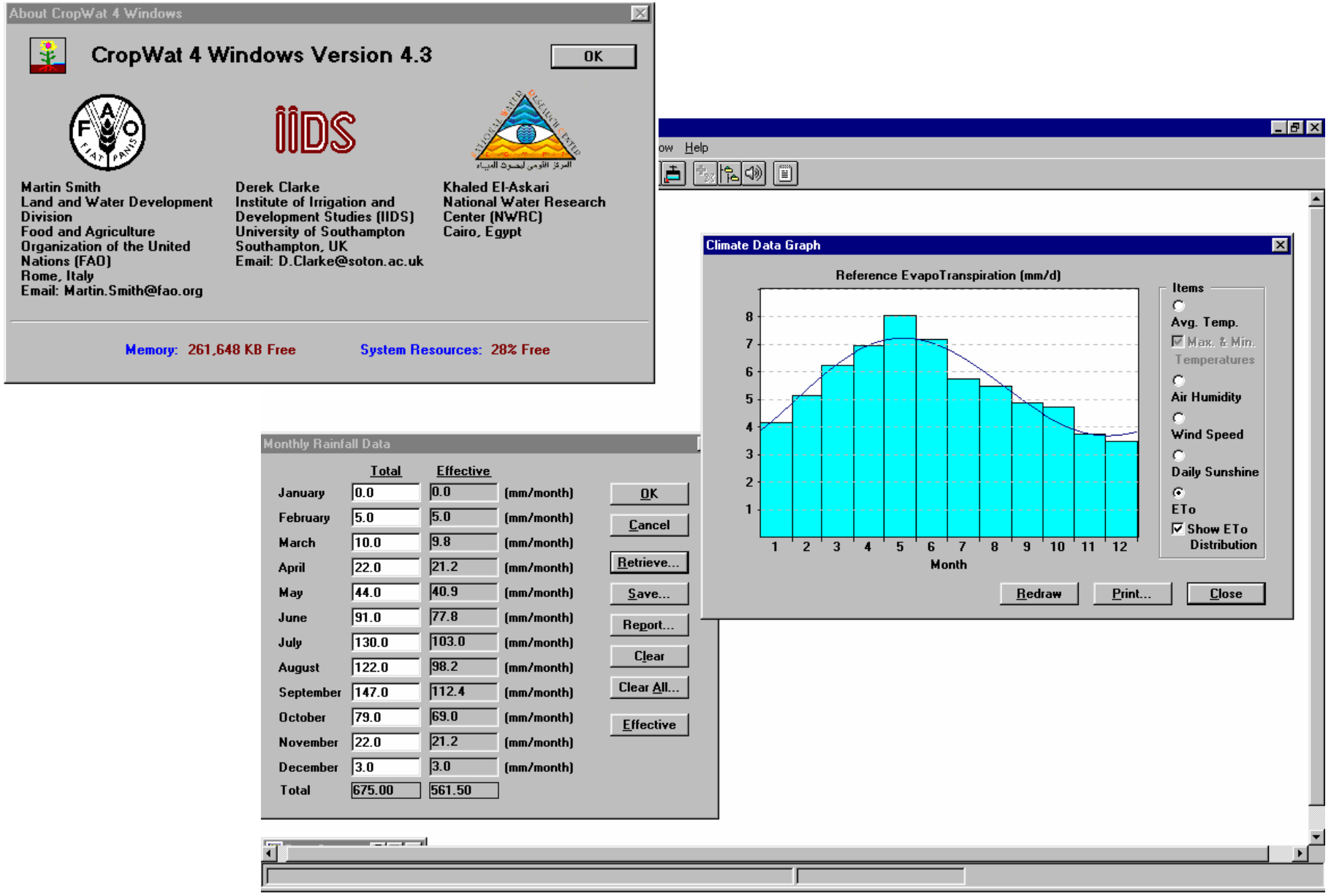
Cropwat is a decision support system developed by AGLW having as main functions:

• to calculate: reference evapotranspiration, crop water requirements, crop irrigation requirements;

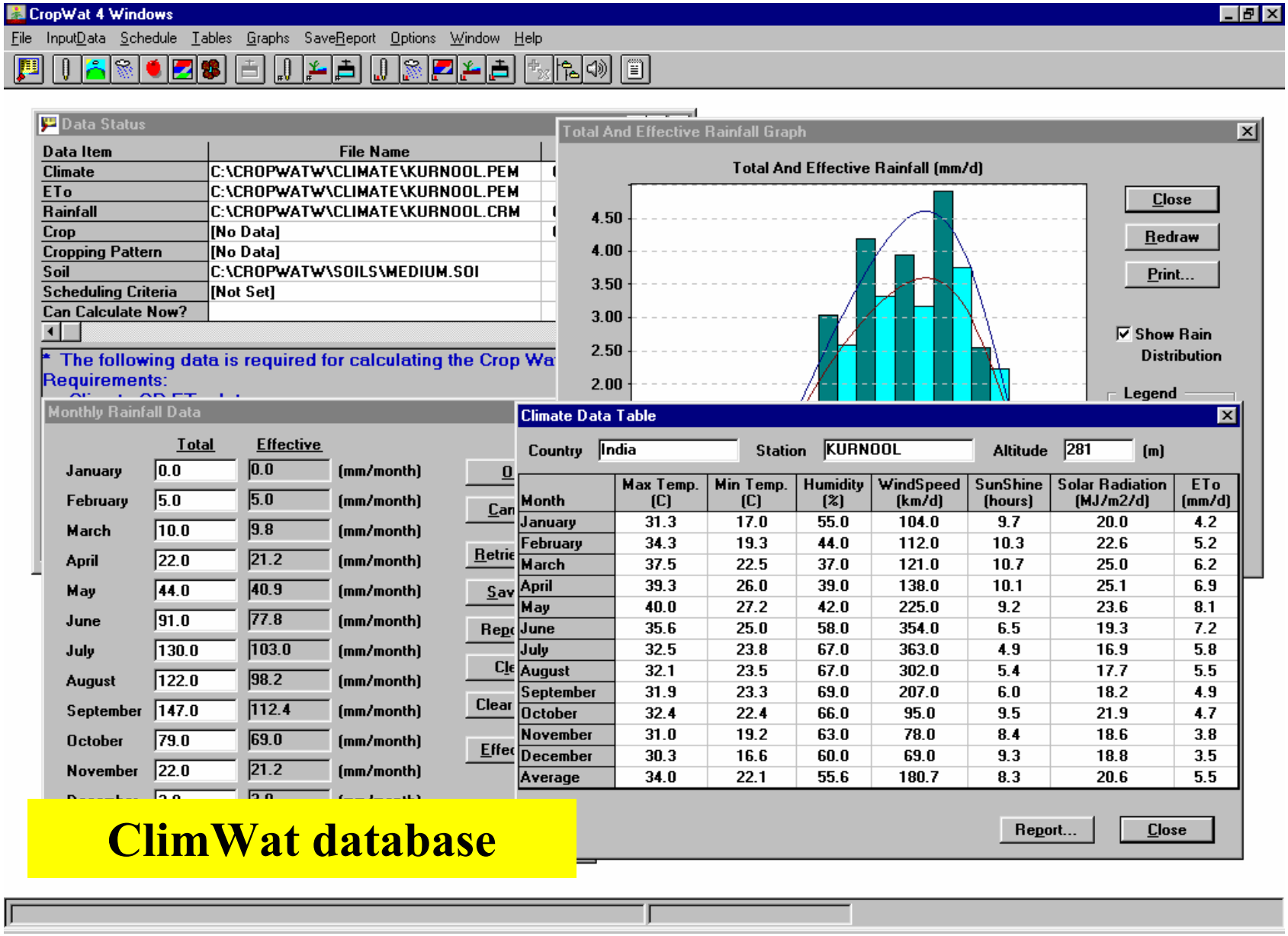
• to develop: irrigation schedules under various management conditions, Scheme water supply;

• to evaluate: rainfed production and drought effects, efficiency of irrigation practices.

CropWat


About CropWat 4 Windows
CropWat 4 Windows Version 4.3
OK
Martin Smith
Land and Water Development Division
Food and Agriculture Organization of the United Nations (FAO)
Rome, Italy
Email: Martin.Smith@fao.org
Derek Clarke
Institute of Irrigation and Development Studies (IIDS)
University of Southampton
Southampton, UK
Email: D.Clarke@soton.ac.uk
Khaled El-Askari
National Water Research Center (NWRC)
Cairo, Egypt
Memory: 261,648 KB Free
System Resources: 28% Free
ow Help
Climate Data Graph
Reference EvapoTranspiration (mm/d)
Month
Items
Avg. Temp.
Max. & Min. Temperatures
Air Humidity
Wind Speed
Daily Sunshine
ETo
Show ETo Distribution
Redraw
Print...
Close
Monthly Rainfall Data
Total
Effective
January 0.0 0.0 (mm/month)
February 5.0 5.0 (mm/month)
March 10.0 9.8 (mm/month)
April 22.0 21.2 (mm/month)
May 44.0 40.9 (mm/month)
June 91.0 77.8 (mm/month)
July 130.0 103.0 (mm/month)
August 122.0 98.2 (mm/month)
September 147.0 112.4 (mm/month)
October 79.0 69.0 (mm/month)
November 22.0 21.2 (mm/month)
December 3.0 3.0 (mm/month)
Total 675.00 561.50
OK
Cancel
Retrieve...
Save...
Report...
Clear
Clear All...
Effective

CropWat



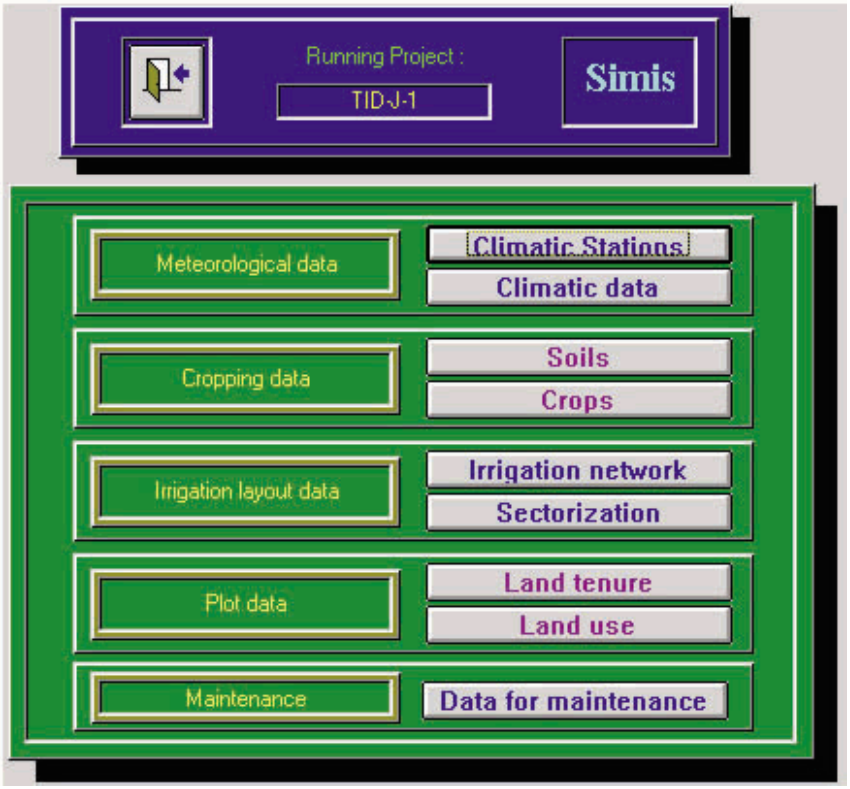
ClimWat database

Scheme Irrigation Management Information System (Simis)

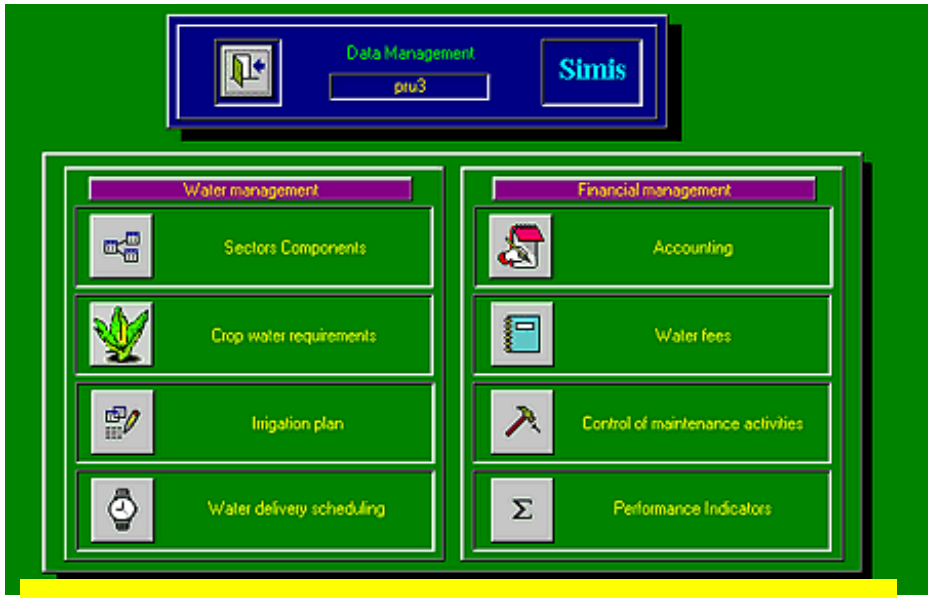
SIMIS is a decision-support software that has been developed for the purpose of facilitating the management tasks of irrigation schemes.

This program is not limited to the water aspects but covers all the major issues of the day-to-day management activities and also includes control of maintenance, accounting, water fees and other relevant tasks.

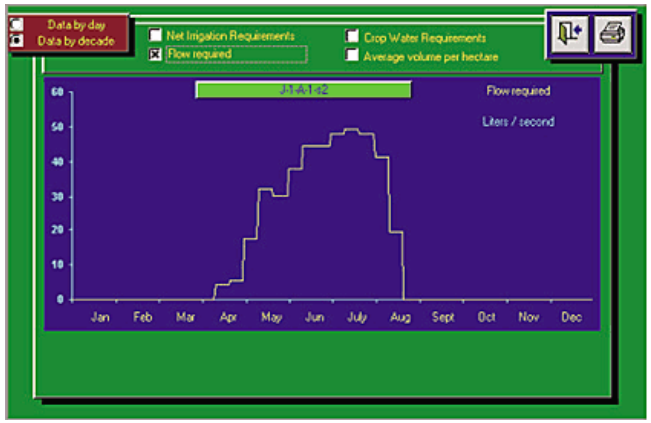
Scheme Irrigation Management Information System (Simis)



Project data module



Water management and financial management modules



Outputs

http://www.fao.org

FAO WEB sites

Environmental information

http://www.fao.org/sd/Endef_en.htm

Links of agro-meteorology

http://www.fao.org/sd/ENlin_en.htm

Digital datasets and agro-meteorological data

http://metart.fao.org/default.htm

WinDisp

http://www.fao.org/WAICENT/faoinfo/economic/giews/english/windisp/windisp.htm

FAO-WMO Agro-meteorology Internet Conference

Agromet-L@mailserv.fao.org