



Centro Nazionale di Meteorologia e Climatologia Aeronautica *Climate Department*

Consistence and management of Italian climatic archives. Future developments.

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Gianpaolo Mordacchini



Summary

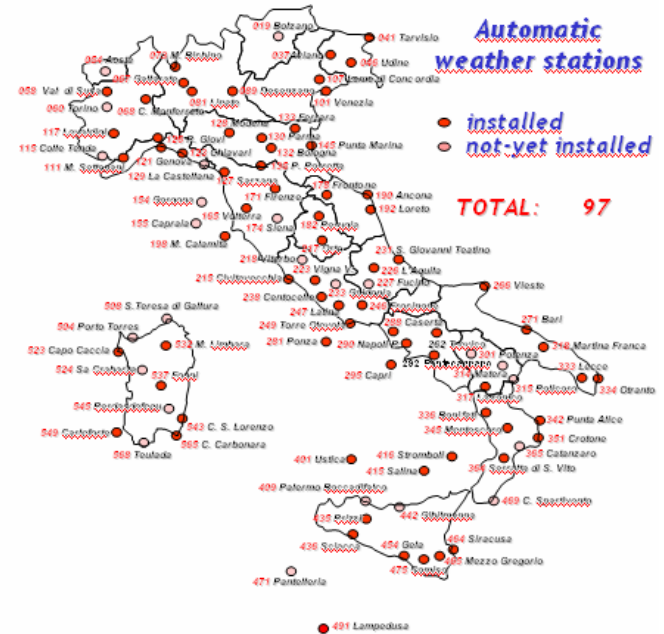
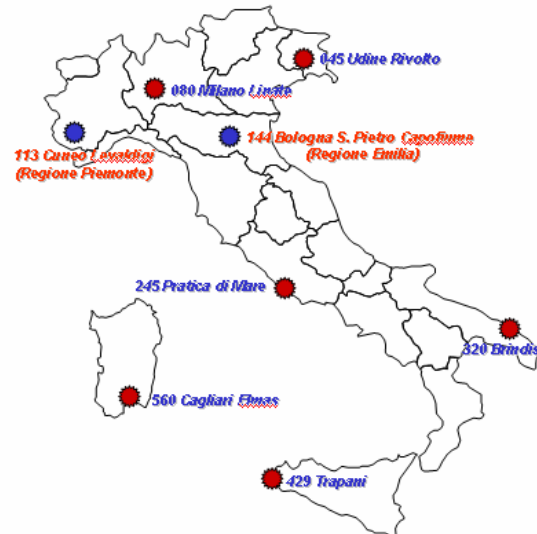
- Air Force network
- Real time data collection
- Climatic e-archive management
- Data QC + homogenization
- Climatic indices, statistics and bulletins
- Paper documentation: historical data on Italy and Africa
- Future developments



DATA COLLECTION 1.



Vertical-sounding stations



DATA COLLECTION 2.



CO₂, O₃, UV, HiVol



LAMPINET
(SFLOC service)

- ★ Elaboration Centre
- 📍 Detectors IMPACT net



Meteorological RADAR



GPM 500 C



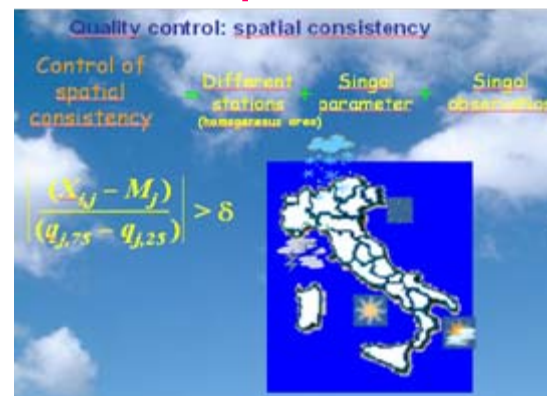


real-time data collection from 1950/55

Climatic indices, statistics and bulletins

Epimeteo

Matlab procedures



Confronto SYNOP-METAR

Caratterizzazione spaziale

Seleziona regione: Tutte

Stazioni disponibili:

- Albenga (GE)
- Alghero Fertilia (SS)
- Ancona (AN)
- Aosta (AO)**
- Arezzo (AR)
- Asinara (SS)
- Augusta (SR)

Selezionate:

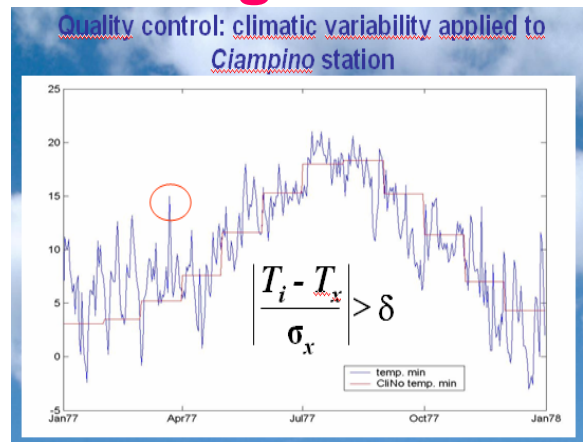
Caratterizzazione temporale

Data iniziale: [] Data finale: 05/05/2010

Selezione parametri

Temperatura	Vento	Altro
<input type="checkbox"/> Aria	<input type="checkbox"/> Direzione	<input type="checkbox"/> Pressione al livello del mare
<input type="checkbox"/> Rugiada	<input type="checkbox"/> Intensità	<input type="checkbox"/> Nuvolosità totale

+homogenization





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Electronic archive

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Parte Pubblica

Atlante Aeronautico

Sommari Climatologici
d'aerodromo

Atlante Climatico

CLINO 61-90

Atlante Europeo

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operazioni

Effemeridi

Normative

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Articoli

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Collaborazioni

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Effemeridi (NEW)

Amministrazione

Gestione dati ACM2

WMO Message Type

Generic Message Type

Classificazione parametri

Stazioni meteo

Anagrafica Stazioni

Gestione tipi di metadato

Gestione metadati

Gestione anagrafica

Monitoraggio

Controllo Thread ●

Dispatcher ●

Poller ●

Decoder ●

Login

Salve Gianpaolo Mordacchini,

Menu utente

Cambio password

Dati

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Controllo disponibilità

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Statistiche e Indici

Calcolo statistiche

Visualizza statistiche

Calcola indici

Visualizza indici

Remember

Remember

Area Web

Gestione Richieste

C.U.S.T.O.M.E.R

Gestione Frasario Lettera

Impegnativa

Gestione Frasario Lettera di

Tramissione

Gestione Impegnative

Gestione prezzario

Test Schemi di Calcolo

Gestione documentale

Manuale

Lettera di Trasmissione MAN

Lettera Impegnativa MAN

Lettera di Cessione MAN

Gestione Licenze Eumetsat

WMO Message Type

WMO Message Type						
id	tt	aa	ii	tipologia	multi	directory_name
1	WO	IY	60	Avviso d'aeroporto	N	WOIY60-AVVAER
2	SA			Metar/Speci	Y	SA-METAR
3	FC			Taf	Y	FC-TAF
4	FT			Tafor	Y	FT-TAF
5	SN	VA		Ship	Y	SN-SHIP
6	FX	IY	50	Meteomont Previt	N	FXIY50-METEOMC
7	FX	IY	68	Previsione breve termine	N	FXIY68-PREVL
8	FX	IY	69	Previsione a medio termine	N	FXIY69-PREVM
9	FX	IY	67	Situazione	N	FXIY67-NOW
10	FX	IY	70	Previsione a 5 giorni	N	FXIY70-PREXH
11	FX	IY	61	Bollettino del mare	N	FXIY61-MARE_IT
12	FX	IY	71	Bollettino del mare in lingua inglese	N	FXIY71-MARE_EN
13	SN	VB		Ship	Y	SN-SHIP
14	SN	VC		Ship	Y	SN-SHIP
15	SN	VD		Ship	Y	SN-SHIP

Epimeteo

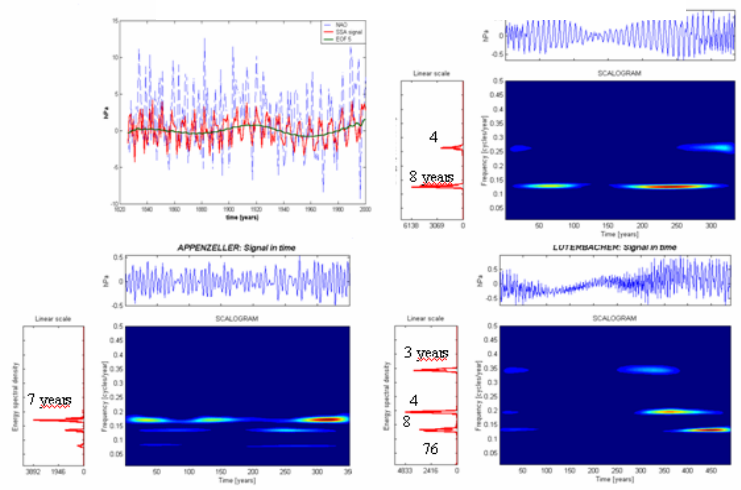
<http://epi.meteoam.it>
(restricted)

60 years-long data

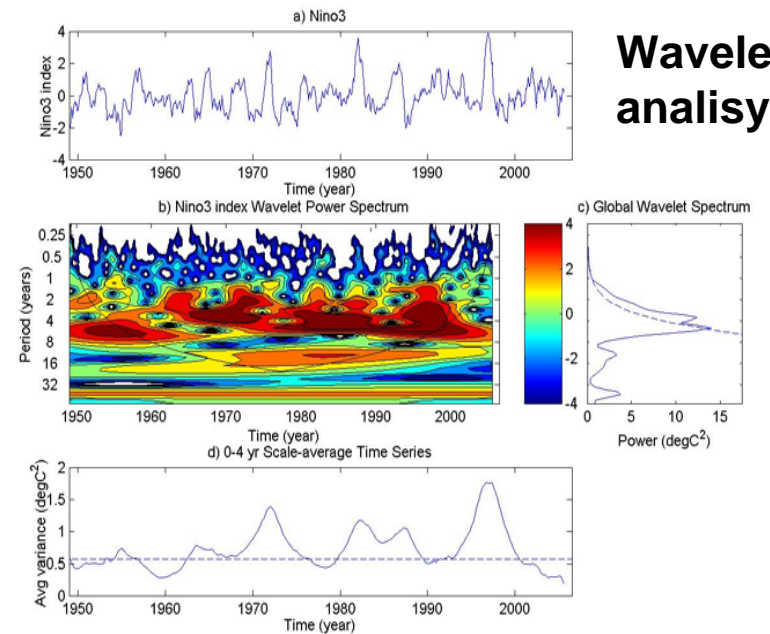
Non-linear statistical tools



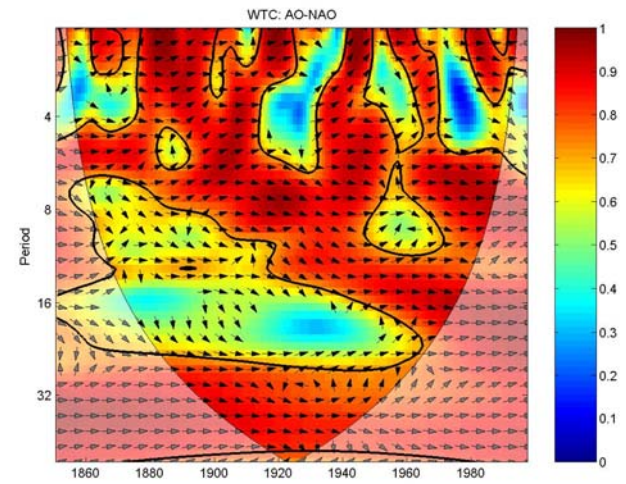
SSA Monte Carlo for proxy reconstruction



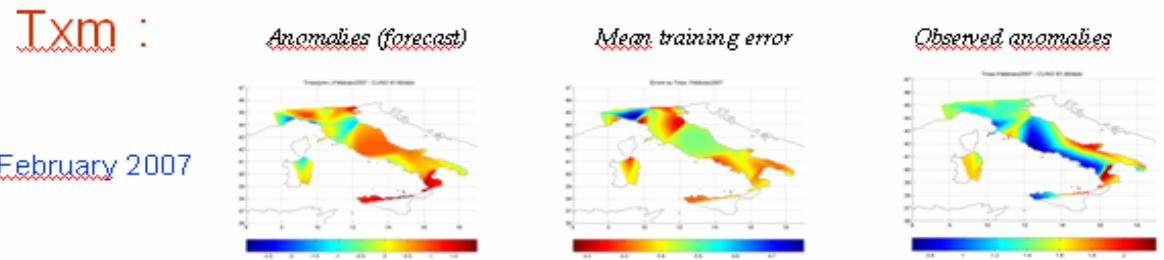
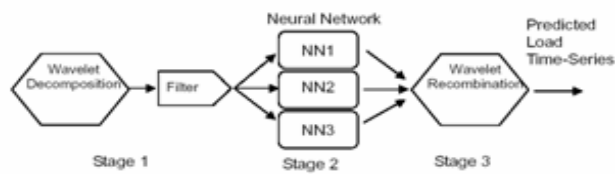
Wavelet analysis



Cross wavelet analysis



Neural net with wavelet decomposition (empiric forecasts)



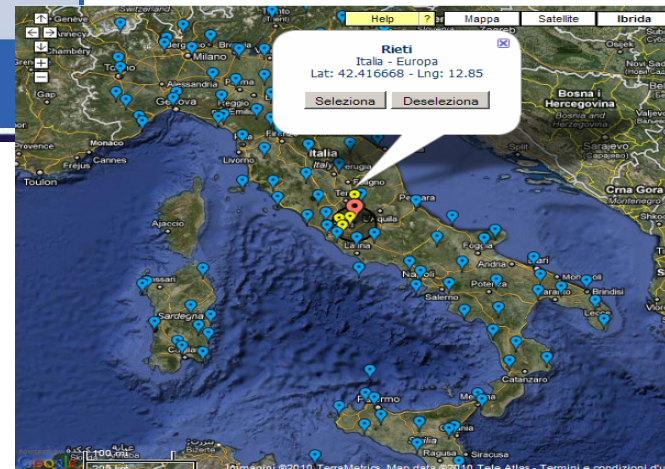
February 2007

public website



C.N.M.C.A.
Climate Department

<http://clima.meteoam.it>





- about 50 000 Italian *obs* were totally digitalized in order to complete the series for the electronic archive

... to ascii

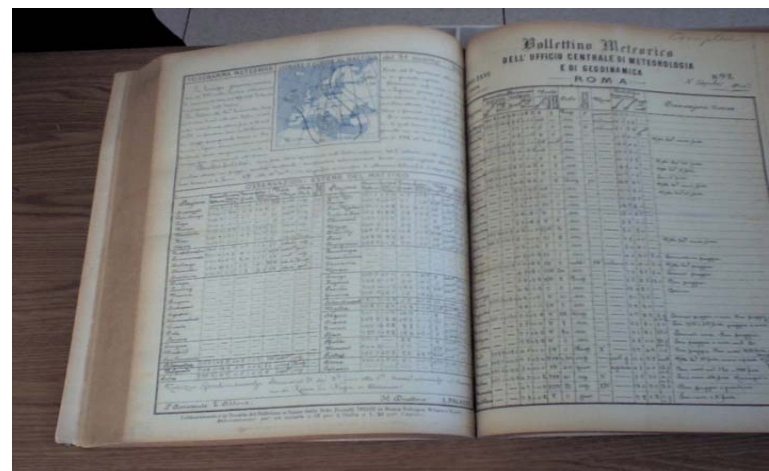
(about 30/40 % of the total work)

- a file by AFCCC archive will extend many Italian datasets from 1925





- Italian data on paper 1925-1950 and we are now obtaining pictures of them (pdf), in order to keep the content saved and integrate previous Italian datasets



- Observations of Lybia, Somalia, Eritrea and Ethiopia
- We are going to participate to **NOAA/NCDC Climate Database Modernization Program**





Archive on Africa (paper format)

Eastern Africa :

Etiopia, Eritrea, Somalia

Total number of observation sites/weather stations: 83

Parameter types :

Synoptic + special observations (solar rad., evapotranspiration,....)

Periods of observations ranging from 1879 to 1960

Lybia



Italian colonies in 1940





Available stations and types of observations

	A	B	C	D	E	F	G	H
1	Stazioni	Tipo di osservazioni	Periodo					
2								
3	Asmara	osservazioni TT,RR,DD, evaporaz 8,17	1922-28, 39-40					
4	Cheren (vicino Asmara Keren)	osservazioni TT,RR,DD, evaporaz 8,17	1919-31					
5	Cheren	syrep	1912-19-20-21					
6	Cheren	medie annuali, precip	1953-58					
7	Cheren	pluvio	1933,37,38					
8	Obbia	4,7,10,13,16,19,21	1936, 37, 38, 39, 40, 1953-58					
9	Cheren, Massaua	riassunto delle osservazioni	1932-40					
10	Cheren	anemometro	1939-40					
11	Uolchittè N 8 17, E 37 40	4,7,10,13,16,19,21	1938-40, 1941 febbraio					
12	Massaua	9,15,21	1900 ott-dic, 1901-1921, 1926-30, 1932-39					
13	Bulo Burti 3.85 N 45.56 E	9,18	1953, 1955,56,57					
14	"	eliografano	1953, 1956-58					
15	Gobuen (Chisimaio)							
16	Mogadiscio	eliografano, attinometro	1953, 1956-59					
17	Mogadiscio	9,12,15,18	1933-40,1942,1944,1946,1948,1949-54, 1958					
18	Capo Guardafui	6,9,12,15	1934-36, 1954-59					
19	Bacoggi (Harar)	8,14	1938-40					
20	Bonka		12 1954-60					
21	El Bur	6,9,12,15	1956-60					
22	Afgoi	9,18+eliografano 57-59	1954-59					
23	Belet Uen	6,9,12,15	1953-60					
24	Afmadu	9,18	1953-54, 56-59					
25	Baidoa	6,12,18	1953-59					
26	Genale	6,9,12	55-60					
27	Genale	8,14,19	1934-39					
28	Lugh Ferrandi (Mogadiscio)	6,12,18--5, 8, 11, 14, 17, 20, 22	1924-40, 1958-60					
29	Adi Ugri	RR	1923-28					
30	Cullucù	RR	1923-38					
31	Debaroa	RR	1927-34					
32	Decamerè	RR	1931-35, 1937-38					
33	Dorfü	RR	1923, 1931, 1934-38					
34	Chisimaio	8,11,14,18	1951-53					
35	Bosaso	6,9,12,15	1959-60					
36	Galcaio	8,11,14,19	1953-54					





Some examples of formats... meteorologically coded data

OSSERVAZIONI DELLE NUBI A ... *Avviso aereo...* DATA *13/3-4h0*

ora T.G.	Q.tà tot.	T. di osservazione	NUBI ISOLATE O AMMASSATE			BANCHI DI NUBI			NUBI STRATIFORMI			C L M C H	ww	NOTE
			Tipo	Q.tà	Spes. Fen. ott.	Tipo	Q.tà	Spes. Fen. ott.	Tipo	Q.tà	Spes. Fen. ott.			
HH DD v	HH DD v	HH DD v	HH DD v	HH DD v	HH DD v	HH DD v	HH DD v	HH DD v	HH DD v	HH DD v	HH DD v			
14.00	1000	W	☉	☉	☉	☉	☉	☉	☉	☉				
14.00	1000	F	☉	☉	☉	☉	☉	☉	☉	☉				
13.00	1700	N	☉	☉	☉	☉	☉	☉	☉	☉				
			☉	☉	☉	☉	☉	☉	☉	☉				

Bollettini Sint. GGgg wwThm_h DD_hN PRPT UURRT_w *14.00 25670 02865 12225 49119 43002*
13.00 25620 02865 12225 46127 60002 23600

Pilot (codice di Salisburgo)
14.00 25607 25102 30124 36001 42022 46054 49465 - Pilot 13.00 - 25613 25111 30152 36001 42133
20425

Descrizione del tempo





2007

... to pdf

- **23 500** meteo-maps 1937-1964 scanned from μ -films support
- **4 000** instrumental diagram (p, v, t, r) (Vigna di Valle, Termoli)
- **2 800** colonies' meteorological forms in various format (about 1 month/scan) period 1892-1956: **Lybia**, Somalia, Eritrea and Ethiopia





2008

... to pdf

- **65 400** meteo-maps 1937-1964 scanned
fm μ -films and paper support
- **65 600** instrumental diagram (p, v, t, r)
(Dobbiaco, Brescia, Roma Ciampino, Brindisi, Cagliari, Catania)
- **20 700** colonies' meteorological forms ...
continuing the previous activity

(about 40 % of the total work)



Some examples of formats...

special observations: solar radiation



REGIO UFFICIO METEOROLOGICO DELL' A. O. I.
OSSERVATORIO PRINCIPALE
AS M A R A
ATTINOMETRO ARAGO

Anno *1940 XVIII* Mese *Maggio* Stazione di *Asmara*

Giorni	h. 8		h. 11		h. 14		h. 19	
	Bianco	Affumicato	Bianco	Affumicato	Bianco	Affumicato	Bianco	Affumicato
1	30.0	42.6	36.6	48.2	27.1	30.5	15.1	15.4
2	33.9	47.2	39.0	55.1	38.4	52.4	18.0	18.3
3	32.1	44.6	38.1	52.4	37.5	52.4	15.5	15.8
4	30.9	43.4	32.9	53.5	16.5	18.1	14.7	14.9
5	27.9	27.5	29.2	37.5	30.5	38.4	17.8	14.0
6	19.8	24.8	29.5	38.2	36.3	52.6	11.6	11.7
7	21.8	27.7	37.3	52.8	36.5	31.7	15.9	16.2
8	31.8	43.5	32.2	40.5	22.4	34.8	18.4	18.6
9	32.1	30.8	30.5	40.0	27.3	33.7	15.8	16.0
10	38.6	40.4	36.2	51.4	20.5	23.5	13.6	13.8
11	28.4	40.2	35.6	51.2	36.6	50.6	16.3	16.5
12	30.8	42.7	38.1	54.2	38.3	52.1	19.0	19.2
13	36.3	45.3	38.9	54.4	38.6	52.4	18.4	19.0
14	32.4	43.8	39.6	54.4	38.5	52.3	12.3	12.5
15	30.0	40.4	39.8	56.1	22.0	22.4	13.4	13.9
16	12.4	19.9	34.0	46.6	25.6	42.7	15.2	15.5
17	23.1	29.7	33.3	44.5	35.4	50.0	17.4	17.6
18	30.1	42.6	33.3	44.5	30.8	36.6	17.4	17.5
19	29.6	40.8	31.2	40.2	36.2	50.5	15.6	15.8
20	29.8	41.6	36.5	52.3	37.1	52.2	12.3	12.6
21	32.9	44.4	38.5	52.7	37.4	51.4	17.9	18.3
22	33.6	55.2	39.1	54.5	33.5	42.0	19.2	19.6
23	33.9	46.4	39.3	54.2	27.4	32.4	19.2	19.5
24	39.3	50.6	39.6	55.6	39.5	52.8	18.8	19.1
25	31.6	43.8	40.2	55.8	39.2	52.8	18.1	18.5
26	31.8	43.8	37.0	51.3	36.6	50.2	16.0	16.2
27	34.0	46.4	37.9	52.8	37.4	50.8	18.1	18.4
28	37.2	42.1	37.9	52.6	38.1	51.3	18.0	18.3
29	32.3	44.4	42.8	53.0	38.8	52.0	19.1	19.4
30	33.1	45.0	39.8	55.4	38.6	52.2	12.0	18.1
31	32.3	43.6	39.2	53.6	38.9	52.3	20.3	20.4

Asmara, It 193





Back to Italy...

Monthly temperature (mean, minimum and maximum)
and *precipitation* secular homogenised data set

- 75 records > 120 years
- 18 records > 160 years
- 6 records > 200 years



<http://www.climagri.it/pubblicazioni/n.50.pdf>

**Consiglio per la sperimentazione
e la Ricerca in Agricoltura**
Climatologia e Meteorologia Applicata



Food and Agriculture Organization of the United Nations

<http://www.fao.org/sd/climagrimed/>





Future developments DARE

- Now we are engaged in a deep IT infrastructure renewal
- A new building for DARE not be completed before next year
- Classifying and sorting of all paper material
- Recovering and digitization to fill and extend present datasets (from 1950/55 to extend up to 1925)
- Complete the scanning of the most important paper/ μ -film material
- Digitization of instrumental records has been taken in account
- Scanning of models of Lybia, Somalia, Eritrea and Ethiopia, ... *work in progress*





*Thanks for your
attention!*

