



**INSTITUTE OF ACCELERATING
SYSTEMS AND APPLICATIONS,
ATHENS, GREECE**
WP10 Coordinator



**MEDITERRANEAN OCEAN
FORECASTING SYSTEM:
TOWARD ENVIRONMENTAL
PREDICTION**



*Mediterranean Forecasting System:
Toward Environmental Predictions*

MFSTEP

Project Deliverable Report D7

WP10: Atmospheric Forcing and Air-Sea Interaction Studies

Project title	MEDITERRANEAN OCEAN FORECASTING SYSTEM: TOWARD ENVIRONMENTAL PREDICTION					
Project acronym	MFSTEP					
Contract number	EVK3-CT-2002-00075					
Deliverable number	D7					
Deliverable title	Corresponding LAM full volume atmospheric data archive for validation studies					
Work package	WP10 Atmospheric Forcing and Air-Sea Interaction Studies					
Name of WP10 Coordinator	Prof. George Kallos Institute of Accelerating Systems and Applications, Athens, Greece					
Date of delivery	March 1, 2004					
Report status		Draft	X	Final		
Project home page	http://www.bo.ingv.it/mfstep/					
WP10 home page	http://forecast.uoa.gr/mfstep/					

1) Introduction

This report provides information about the meteorological hindcast data produced under the scopes of deliverable 7 of WP10. This work package contains the necessary activities to create and deliver the atmospheric surface fields to the ocean modeling community, and to define and perform the Scientific Validation Period (SVP) intercomparison of atmospheric models. The aim of this sub-task (deliverable 7) is to produce the meteorological hindcast data for the SVP period using the Limited Area models and the Meteo-France Global model fields, and to disseminate them to the ocean modelers.

2) Data and Methods

In the framework of the SVP of WP10, the nonhydrostatic SKIRON/Eta and the Aladin models were integrated at high-resolution (0.1 x 0.1 degrees). 72-hour hindcasts were produced utilizing the 0000 UTC cycle ARPEGE fields of January 2003 as initial and lateral boundary conditions. The ARPEGE fields were provided by Meteo-France at a resolution of 0.25 x 0.25 degrees.

In SKIRON/Eta the initialization of the soil moisture and temperature was performed using the 24-hour forecast of the run of the previous day. In Aladin model the assimilation mode started one day prior to the SVP, i.e. 31/12/2002 00 UTC in order to avoid spin-up of the assimilation cycle. This was based on the late cut-off time of the 4DVAR data assimilation system of the global model ARPEGE. Every day at 00 UTC a +72h forecast has been run, where initial files were obtained from the Aladin/Mfstep assimilation cycle, and the lateral boundary data were provided by the early cut-off forecasts of the driving model ARPEGE.

3) Dissemination of the SVP hindcasts

The computational domain of both models covered the whole Mediterranean region and part of Central Europe (Figures 1, 2). Following the decisions made at the WP10 meeting in Athens (June 2003), the subtask partners decided that both SKIRON/Eta and Aladin models will provide forecasts for the whole Mediterranean and Black sea regions. Therefore the dissemination domain of SKIRON/Eta model extends from 29°N to 48°N and from 11°W to 42°E (Figure 1). The Aladin raw data were post-processed separately on two domains (Mediterranean = 30°N-48°N, 19°W-37°E; Black-Sea = 40°N-48°N, 27°E-42°E; see Figure 2). These fields are available every hour from the initial time up to 72 hours at a regular horizontal grid of 0.1x0.1 degrees.

The SKIRON/Eta and ALADIN-MFSTEP meteorological fields that become available to the project partners (hourly) in GRIB format are the u and v component of the 10m. wind, the 2m. air temperature, the 2m. specific humidity, the cloud fraction, the mean sea-level pressure, the total hourly accumulated precipitation, the downward/upward shortwave and longwave radiative fluxes, the evaporation, the surface latent and sensible heat flux, the land-sea mask and the sea-surface temperature (Table 1). In the output of SKIRON/Eta model the evaporation corresponds to its instantaneous value, while in the output of Aladin model the evaporation corresponds to hourly accumulated values. Moreover, ALADIN provides the same radiation fluxes but computed for a cloudless atmosphere (Table 1). In addition to the required surface variables, the upper air fields of geopotential, temperature and wind components at 500 and 850 hPa every 6 hours were delivered (not included in Table 1) for the purpose of the inter-comparison of the two LAM models used.

Meteorological Variables	Units	Grib Code SKIRON/Eta	Grib Code Aladin
u component of the 10m wind	m/s	33	33
v component of the 10m wind	m/s	34	34
2m Air temperature	K	11	11
2m specific humidity	Kg/Kg	51	51
cloud fraction	%	71	71
mean sea-level pressure	Pa	2	2
Total accumulated precipitation (hourly intervals)	kg/m ²	61	61
downward shortwave radiation flux	W/m ²	204	154
upward shortwave radiation flux	W/m ²	211	152
downward longwave radiation flux	W/m ²	205	153
upward longwave radiation flux	W/m ²	212	151
Evaporation	Kg/m ²	57	57
surface latent heat flux	W/m ²	121	121
surface sensible heat flux	W/m ²	122	122
land-sea mask	land=1, sea=0	81	81
sea-surface temperature (only analysis)	K	11	11
Clear-sky shortwave down radiation flux	W/m ²	-	158
Clear-sky shortwave up radiation flux	W/m ²	-	156
Clear-sky longwave down radiation flux	W/m ²	-	157
Clear-sky longwave up radiation flux	W/m ²	-	155

Table 1 Description of the fields included in the GRIB encoded files.

The hourly data both from assimilation (only for Aladin model) and forecast mode were made available to the project partners well in advance of the deadline of Deliverable 7. The SVP GRIB files are made available through the WP10 webpage (<http://forecast.uoa.gr/mfstep/>) and through the IASA ftp server (<ftp.mg.uoa.gr>, IP: 195.134.91.103). The interested partners can be provided with a username and a password on request. The Aladin/Mfstep SVP data have been uploaded to IASA ftp server because of the limited capacity of CHMI Internet connection (2Mbits per second). They have been stored in the directory 'svp/Aladin' where a short 'readme' file is also at disposal. Similarly the Skiron/Eta SVP data have been stored in the directory 'svp/Skiron'. No download of SVP data from CHMI will be possible, but these data can be sent on DVD to interested partners if requested.

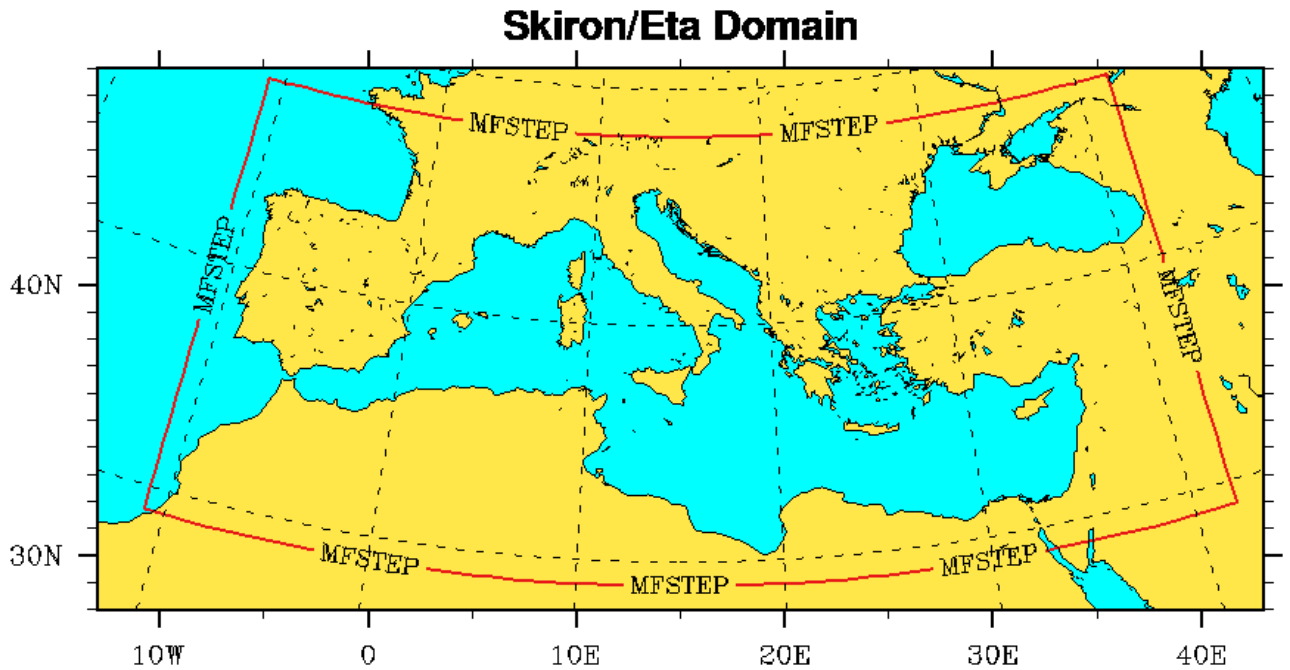


Figure 1. The computational and dissemination (framed) model domain of Skiron/Eta modelling system.

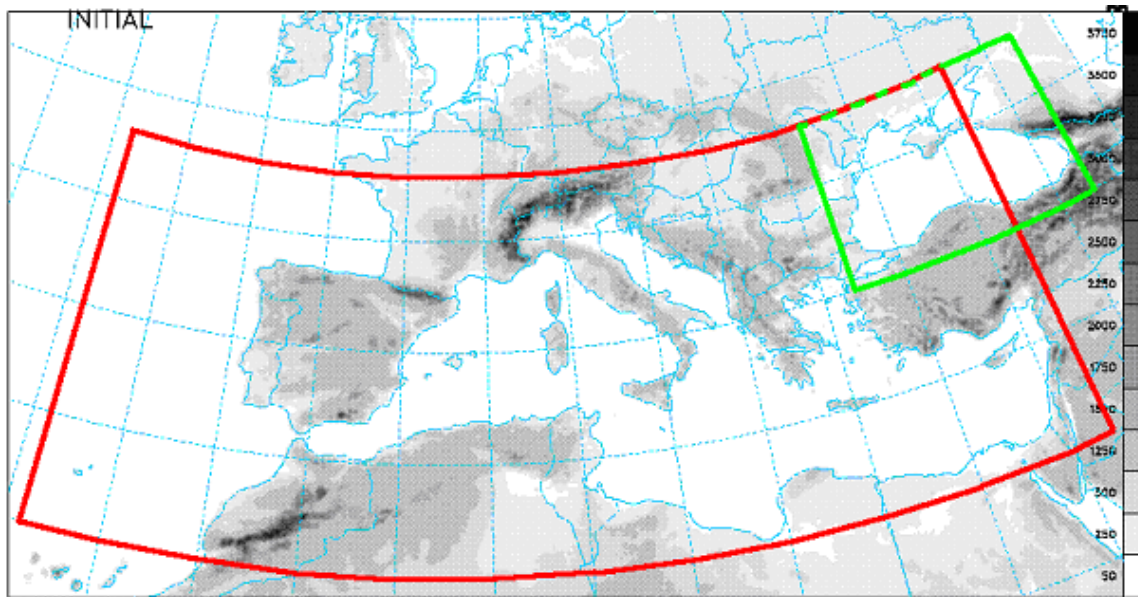


Figure 2. The computational domain of Aladin model and the associated orography. The two color frames encompass the dissemination domains of Meteo-France and CHMI

The filename convention of the IASA GRIB files is:

MFSTEP_IASA_TTDDMMYY_XXX.grb

where TT, DD, MM and YY are the time, date, month and year (respectively) of the initial time and XXX is the forecast time (in hours). For example, the file MFSTEP_IASA_00250103_066.grb corresponds to the 66 hours forecast of IASA from 0000 UTC, 25 January 2003. Its valid time is 1800 UTC, 27 January 2003.

Regarding the CHMI SVP hindcasts two dissemination domains are available:

Mediterranean sea [-19W,37E];[30N,48N] => 561x181 points, abbreviated 'm'

Black sea [27E,42E];[40N,48N] => 151x81 points, abbreviated 'b'

Data from both analysis (denoted 'a', usage of the abbreviation is described below) and production ('p') modes are disseminated.

The naming convention follows the WP8 and WP10 proposal, slightly modified to mirror some extra specifications:

MFSTEP_CHMI_{dm}_HHDDMMYY_XXX.grb, where

d stands for domain (hence 'b' or 'm')

m stands for mode (hence 'a' or 'p')

HHDDMMYY denotes the starting forecast time (hour day month year)

XXX is the validity range of the forecast (in hours).

For example:

MFSTEP_CHMIma_00030103_000.grb

is the analysis ("0h forecast") from the assimilation cycle, starting (and valid) at 03/01/2003 00 UTC, post-processed to Mediterranean sea domain;

MFSTEP_CHMIma_00030103_004.grb

is the +4h forecast within the assimilation cycle, starting from 03/01/2003 00 UTC, valid at 03/01/2003 04 UTC, postprocessed to Mediterranean sea domain;

MFSTEP_CHMIbp_00030103_028.grb

is the +28h forecast in production mode, starting at 03/01/2003 00 UTC, valid at 04/01/2003 04 UTC, post-processed to Black sea domain.