

# RSMC TOULOUSE 2015 REPORT

## Executive Summary

Primary activities for 2015 consisted of the Regional Specialized Meteorological Centre (RSMC) tests, including quarterly IAEA tests and regular monthly tests and incremental updates and improvements to the response procedures, software, and to the joint RSMC secure web pages, which are used for communicating transport model products to National Meteorological and Hydrological Services (NMHS) and between RSMCs. RSMC Toulouse received – both operational and planned - requests for inverse modelling support from the Provisional Technical Secretariat (PTS) of the Comprehensive Test Ban Treaty Organization (CTBTO) during all the year.

## 1. Introduction

Météo-France is designated by the WMO as the Regional Specialized Meteorological Centre (RSMC) for the provision of atmospheric transport modelling in case of an environmental Emergency Response. The regions of responsibility are WMO Regional Associations (RA) I & VI which encompasses Europe, Ukraine, the Russian Federation and Africa.. This responsibility is shared with RSMC Exeter. Meteo-France National Forecast Centre operates 24 hours a day, 7 days a week and has the responsibility of providing forecasts for the spread of pollutants (nuclear, chemical). The service consists on an immediate delivery of meteorological observation data, followed by forecast and modelling dispersion products. In case of a nuclear accident, national meteorological services could « request for RSMC support ».

In addition to emergency response, RSMC Toulouse contributes global inverse modelling support to the CTBTO verification system

## 2. Operational Contact Information

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### 3. Responses and information on dissemination of products

#### 1) Models used

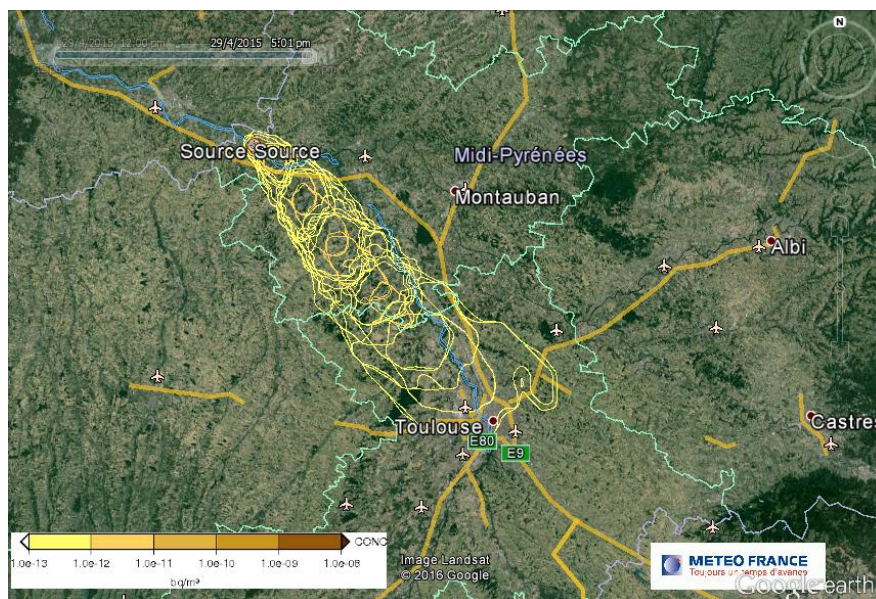
Two models may be used, according to the needs :

- The global **MOCAGE** model coupled with the French atmospheric global model ARPEGE or with the European ECMWF global model. Standard outputs are available 20 minutes after launch, for a three days or more forecast. MOCAGE offers the possibility of computing retro-trajectories for CTBTO. The resolution is  $0.5^\circ$  for 47 vertical levels
- The local **PERLE** high resolution dispersion model system.

3 possibilities of meteorological coupling :

- AROME model up to 2,5 km resolution covering France
- ARPEGE/MESO-NH covering Europe
- ECMWF/MESO-NH global cover.

LPDM diffusion model is used. First outputs are available 15 minutes after launch. The forecast is up to 24 hours, the outputs resolution is 2 km, for a 60km\*60 km domain and 8km for a 240km\*240 km.



Exercice on NPP Golfech 29/04/2015. PERLE output imported in googlearth as shapefile (0-500m layer concentration)

Products are distributed either by fax, email, on internet (mirror web sites of Toulouse RSMC, with a specific external link created for each new event)

The presentation of RSMC Toulouse is available on <http://www.meteorologie.eu.org/CMC>

- 2) Participation in international inverse dispersion modelling events and exercises with CTBTO

During 2015 RSMC Toulouse received occasional requests for both real and exercise scenarios from the Provisional Technical Secretariat of the Comprehensive Test Ban Treaty Organisation (CTBTO). These were all responded to within the expected timescale

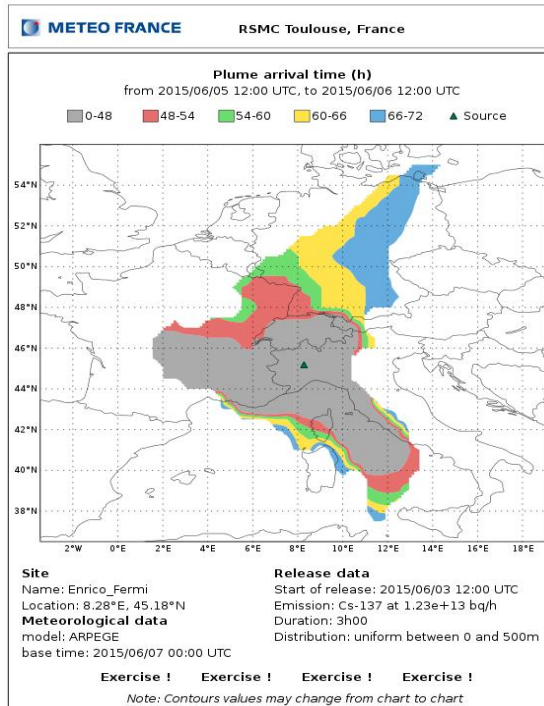
- 3) Routine operations

Quarterly exercises: RSMC Toulouse took part in the different quarterly exercise planned by IAEA. Graphics were posted to the relevant RSMC mirrored websites, as well as to the IAEA and to NMSs within RA I and RA VI

In addition, RSMC Toulouse has been responding to the monthly tests hold by RSMCs Melbourne, Montreal and Washington by running dispersion models and sending output onto the mirrored RSMC web pages.

#### **4. Significant operational or technical changes in 2015 :**

- MOCAGE : using 3 hours temporal frequency for meteorological forcings.
- PERLE :
  - using the new horizontal resolution of :
    - ARPEGE (7.5 km over France)
    - AROME (1.3km)
    - IFS (9km)
  - New grid for MesoNH (2km) over its greatest domain, instead of 2 nested grids of 8km (greatest domain) and 2 km (lowest domain) → Now the convection is completely resolved on the whole domain
- First study on ensemble forecasting on dispersion model will continue, based on Mocage and Perle. The main conclusions of this study are :
  - Development of a DEPS based on :
    - Forcing by global atmospheric ensemble (PEARP for MF)
    - Tuning of top and bottom of the release
  - Most of RSMCs can have access to Global EPS
  - Experiments can be done through TIGGE dataset
  - Different kind of probabilistic products used for atmospheric EPS could be applied to DEPS
  - BUT :
    - It is costly (in terms of informatic and human ressources)
    - Source term uncertainties description remains a big issue
    - Validation is also a big issue for EPS, specifically for DEPS
    - « education » of end users will be necessary
- Development of "Time of Arrival" new product (as soon as the WMO ERA group will set up a standard product)



Exemple of ToA product

## 5. Plans for 2016-2017 :

### Developments and studies

- Development of operational “Time of Arrival” product (as soon as the WMO ERA group will set up a standard product)
- Beginning of developing MOCAGE high resolution (from 0.5° now to 0.125 or 0.1°)
- PERLE using AROME new resolution 1.25 km, higher resolutions for the large domain of MESONH –Perle forecasts (both small and large domains will use a 2 km resolution).
- Studies on ensemble forecasting on dispersion model will continue.
- Development of a new GUI for launching dispersion models
- Study on providing forecast “under wind areas” using our new HR nowcasting model
- Study on replacing LPDM by FLEXPART
- Running HR dispersion model on overseas areas

### International exercises

- RSMC Toulouse will take part in all IAEA or WMO emergencies requests, tests and exercises, and in all CTBTO requests.
- RSMC Toulouse will participate to the monthly test hold by RSMC Washington/Melbourne/Montreal.

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