



**METEO FRANCE**  
Toujours un temps d'avance



# Measurements of integrated water vapour column from ground GPS stations Meteo-France's program status

M. Mauprivez (Meteo-France)



Toulouse – 17 January 2008



**METEO FRANCE**  
Toujours un temps d'avance

# Presentation plan

**1. The requirement satisfaction**

**2. The RGP status**

**3. Action continuation**

**4. Conclusion**



# 1. The requirement satisfaction



# REQUIREMENT RECALL

Type of requirements	Minimum	Realist 1 <sup>st</sup> objective	The best			Climatology	Remarks
			AROME	CMS	PI		
Type of data	ZTD	ZTD	ZTD, (ZWD, IWV)	IWV	ZWD, IWC, IWV map	New analysis IWV	Pressure captor on the station for ZWD and temperature captor for IWV
Decimal number of the data	ZTD : 1 mm	ZTD : 0,1 mm	ZTD, ZWD : 0,1 mm – IWV : 0,01 mm		IWV : 0,01 mm	IWV : ≤ 0,5 kg/m <sup>2</sup> (COST 716)	ZTD : indicative value ~2 m ZWD : indicative value ~0-30 cm 1 kg/m <sup>2</sup> of IWV ⇔ 6,5 mm of ZWD
		ZTD : from 3,25 to 13 mm IWV : from 0,5 to 2 kg/m <sup>2</sup> (COST 716)			0,5 to 2 kg/m <sup>2</sup>		
					2 kg/m <sup>2</sup> (COST 716)		
		E-GVAP = COST 716			E-GVAP = COST 716		
Minimum horizontal resolution (network resolution)	150 km	50-70 km	20 km	?	10 km	?	
	250 km (COST 716)	From 10 km to 250 km (COST 716)			From 10 km to 100 km (COST 716)		
	E-GVAP = COST 716				E-GVAP = COST 716		
Time frequency	30' [or 60', but at H+00]	15'	5'	?	5'	15'	Data with 60 minutes resolution used only by 3DVAR ALADIN model
	E-GVAP : No current demand but preference for observing data at the full hour				E-GVAP = COST 716		
Maximum delay between the observation and the reception hour for assimilation for 90% of data	3 H	1H30	From 15' to 30'		15'		Today : the arrival period of the most part of data from GTS is lower than 90 minutes (between 60 and 75 minutes).
		From 30' to 2H (COST 716)			From. 5' to 30' (COST 716)		
		1H30			E-GVAP = COST 716		



# REQUIREMENT SATISFACION AND PRESENT SITUATION

Type of requirements	Realist - 1 <sup>st</sup> objective	Present situation	Remarks	
Type of data	ZTD	ZTD	Pressure captor on the station for ZWD and temperature captor for IWV	
Decimal number of the data	0,1 mm	0,1 mm	Since COST software 2 <sup>nd</sup> version ZTD : indicative value ~2 m	
	From 3,25 to 13 mm (COST 716 and E-GVAP)			
Minimum horizontal resolution (network resolution)	50 – 70 km	100 km	103 operational station in the RGP at the beginning of May 170 operational station in the RGP at the end of 2007	
	From 10 km to 250 km (COST 716 and E-GVAP)			
Time frequency	15’	15’ (H+00 – H+15 – H+30 – H+45 - H+59)	Since end of January	
	E-GVAP : No current demand		But preference for observing data at the full hour	
Maximum delay between the observation and the reception hour for assimilation for 90% of data	1H30	Between 0H45 and 1H30 (≅ 80% data)	Data H+15 – H+30 – H+45 – H+59	Since end of January Before up to 1H40
		Up to 1H30 (≅ 20% data)	Data H+00	
	From 30’ to 2H (COST 716)			
	E-GVAP ≤ 1H30		Possible time reduction in the future Data with a slightly longer delay accepted	



# Why a delay for the « H+00 » data ?

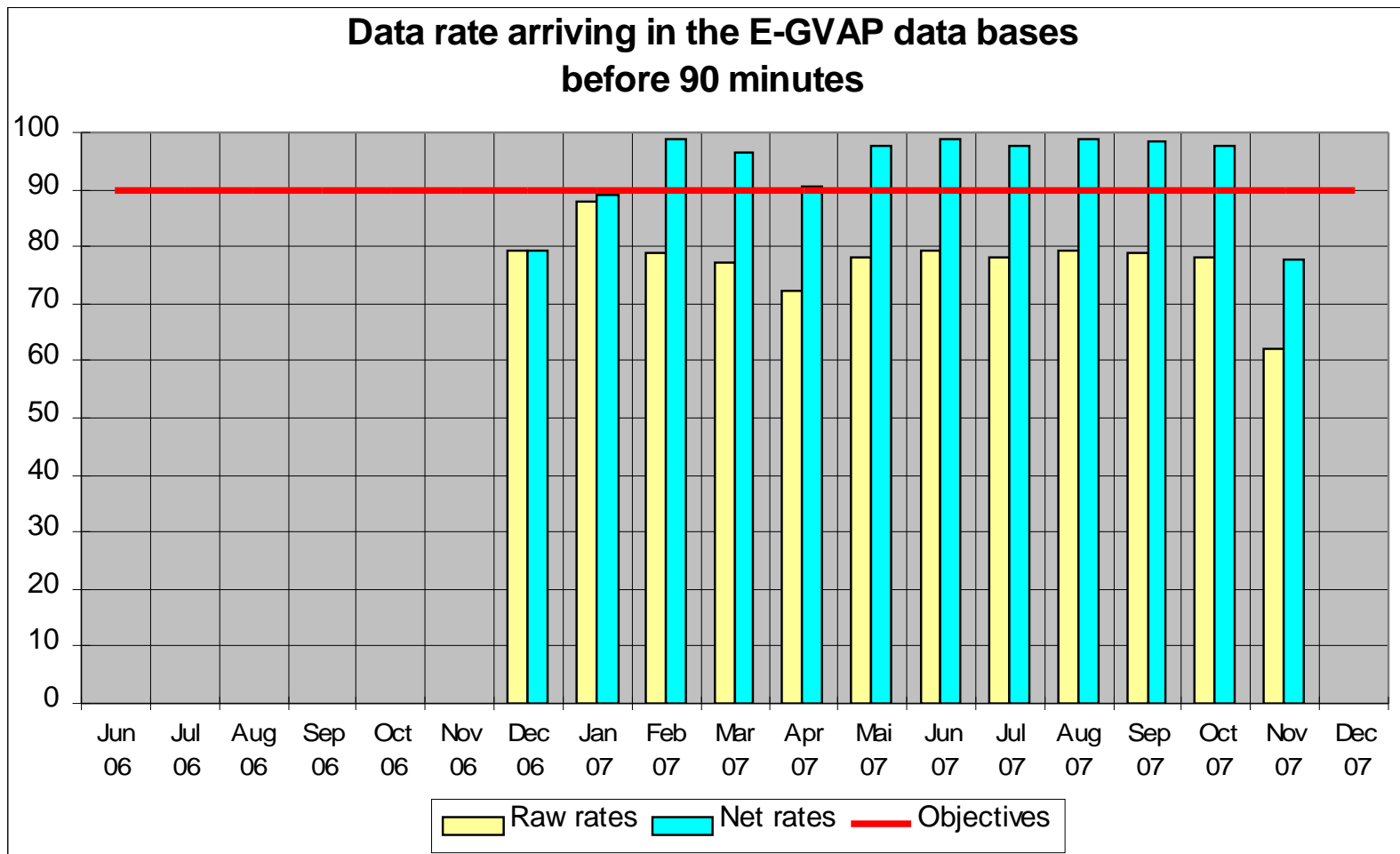
## Explanations

H-500	Five data hours	H+00    H+30    H+59				Total : Six data hours to calculate one ZTD data
		H+15	H+45			
	Data H+00 ≡ Data H-100 at the real time					<u>Treatment</u> : 5 hours data before and 1 hour data after (the best) <u>H+135</u> : first ZTD data arrival
	Data H+15 ≡ Data H-45 at the real time					<u>Treatment</u> : 5 hours and 15 min data before and 45 min data after <u>H+120</u> : first ZTD data arrival
	Data H+30 ≡ Data H-30 at the real time					<u>Treatment</u> : 5 hours and 30 min data before and 30 min data after <u>H+105</u> : first ZTD data arrival
	Data H+45 ≡ Data H-15 at the real time					<u>Treatment</u> : 5 hours and 45 min data before and 15 min data after <u>H+50</u> : first ZTD data arrival
	Data H+59 ≡ Data H+00 at the real time					<u>Treatment</u> : 6 hours data before and 0 min data after (the worse) <u>H+35</u> : first ZTD data arrival
H-600	Real time	H-45    H-15				H+00 is the present time H+25 : beginning of the treatment H+35 : first ZTD data arrival
		H-100	H-30	H+00		



# Why a delay for the « H+00 » data ?

## Consequences



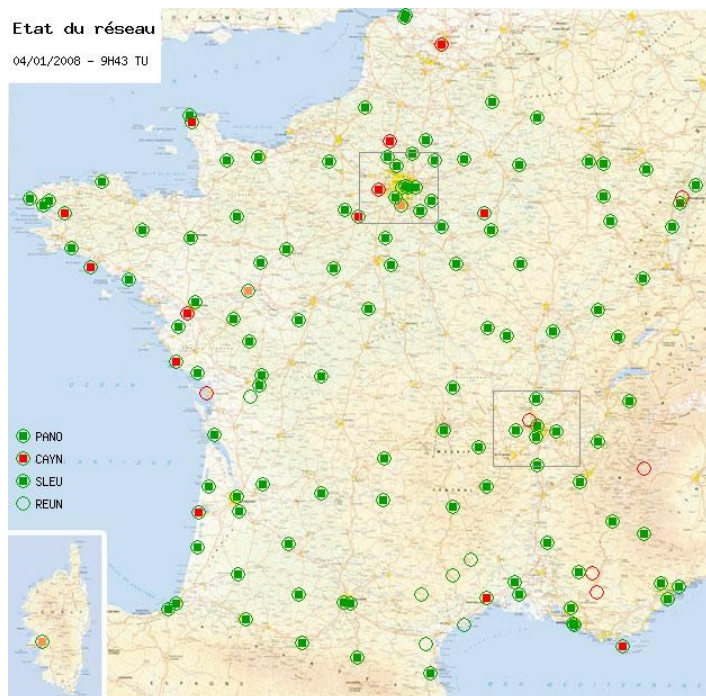


## 2. The RGP status



Toulouse – 17 January 2008

# The RGP and the TERIA networks

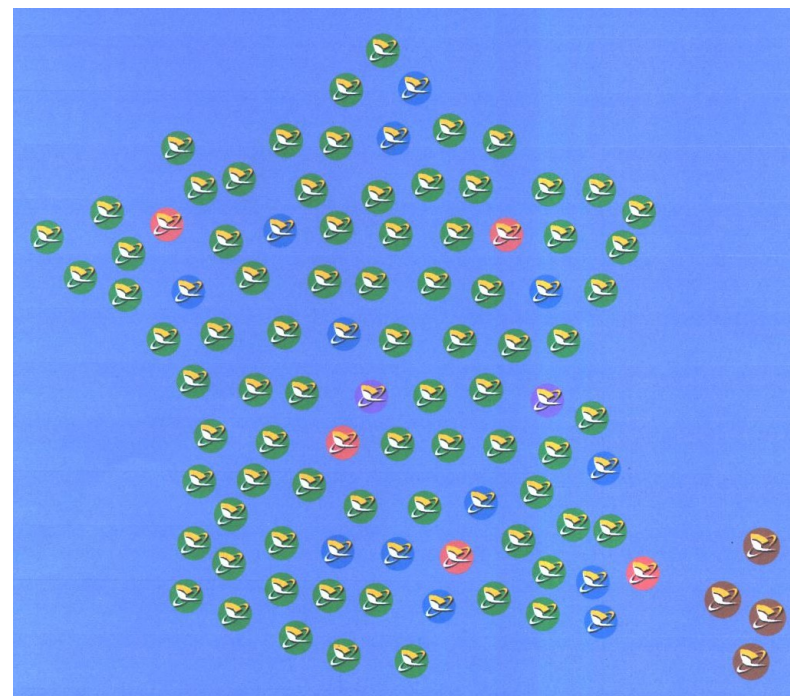


## The RGP network at the 4<sup>th</sup> January 2008 :

72 TERIA stations  
22 IGN stations  
50 other stations

## The RGP network at the end of March 2008

100 TERIA stations  
22 IGN stations  
50 other stations



## The TERIA network at the 4<sup>th</sup> January 2008 :

Green colour : spreaded stations (but not necessary operational)  
Red colour : incomplete files  
Brown colour : files in progress  
Blue colour : validated sites  
Purple colour : possible sites



# 3. Action continuation



Toulouse – 17 January 2008

# Action continuation (I)

## Since the lost E-GVAP plenary meeting :

### **French plenary meeting the 12<sup>th</sup> October 2007 :**



Regular increase of the RGP station number but a low delay in our objective of 170 stations in the metropolitan territory ( $\cong$  3 months) ;

The second treatment software (SGN1 chain) is better than the first (SGN\_ chain)  
Consequences : SGN1 become the operational chain (with the name SGN\_) ;

To implement a national data quality and availability control (meeting about that in December 2007) with a previous test period ;

Data assimilation in the ARPEGE model : possible during the 2<sup>nd</sup> quarter 2008.

To achieve the first phase of this action (to satisfy the need of the 1<sup>st</sup> objective) with the same organization and to move to a service project for the 2<sup>nd</sup> phase (to satisfy the now-casting need).

### **Many contacts with partner organism IGN**

End of the protocol signed at the end of March but cooperation continuation ;

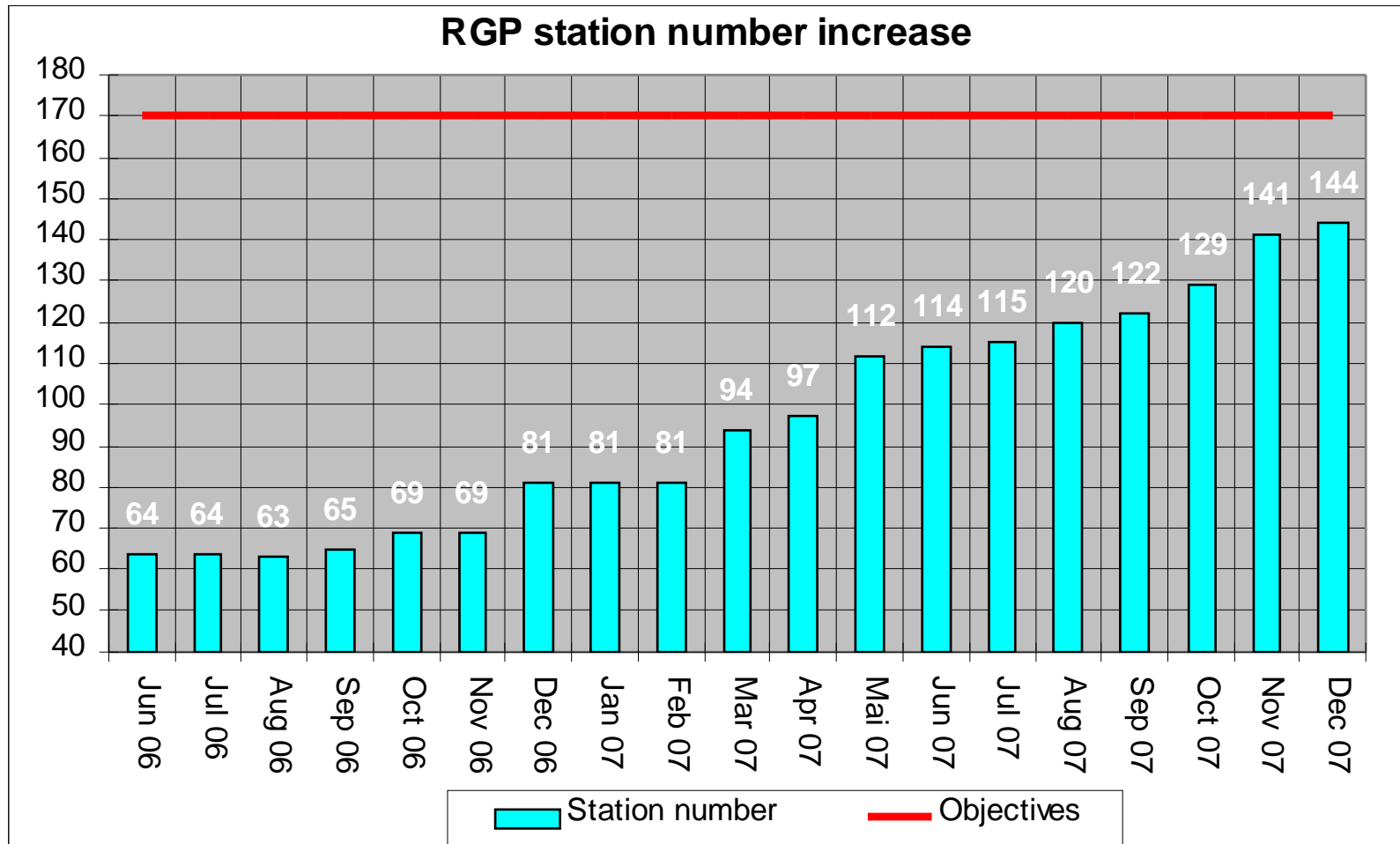
2 meetings since middle of June 2007 (27<sup>th</sup> September 2007 and 15<sup>th</sup> January 2008) ;

Meteo France provides temperature/pressure measurements near the GPS stations ;

Updating of the general MoU between IGN and Meteo France.



## Action continuation (II) : Network evolution since middle 2006



# 4. Conclusion



Toulouse – 17 January 2008

## **Situation at the end of 2007 :**

End of 2007, 144 stations in the French GPS station network ;

End of March 2008, objective : 170 stations ;

Meso-scale now-casting requirements satisfied (now) but perfectible ;

Continuation of the cooperation with IGN ;

Improvement of the data treatment (new treatment chain) and assimilation in the APEGE model during 2008 (with data quality and availability control) ;

End of the first phase of this action at the middle of 2009 ;

Continuation of this action in a second phase :

In the way of a project service (other needs like the now-casting need) ;

To extend cooperation with other organisms.

