



# Evaluation des prévisions Arpege sur la période NAWDEX et lien avec la dynamique des bandes transporteuses d'air chaud

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Réunion DIP-NAWDEX: 29 Jan 2019

# Objectifs / plan

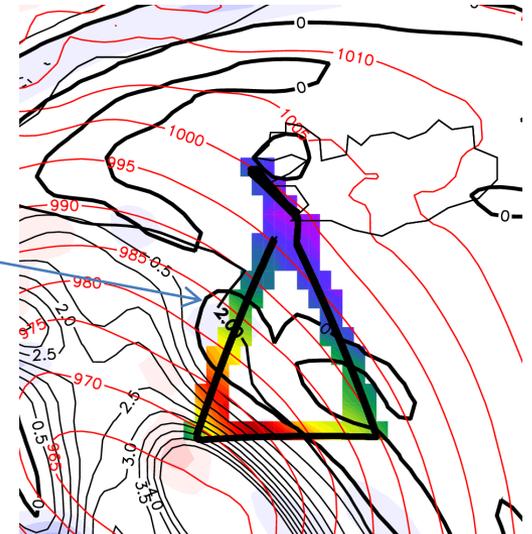
## Partie 1:

- Quelles sont les **différences systématiques** entre les sorties **Arpege (PEARP)** et les **observations aéroportées** en termes de **vent horizontal** (Doppler RASTA) et de **contenu en glace** (Delanoë and Hogan, 2008; Cazenave, 2018) ?
- Existe-t-il des **différences systématiques** entre **PEARP-B85** et **PEARP-PCMT** en contenu en glace, PV et vent horizontal ?

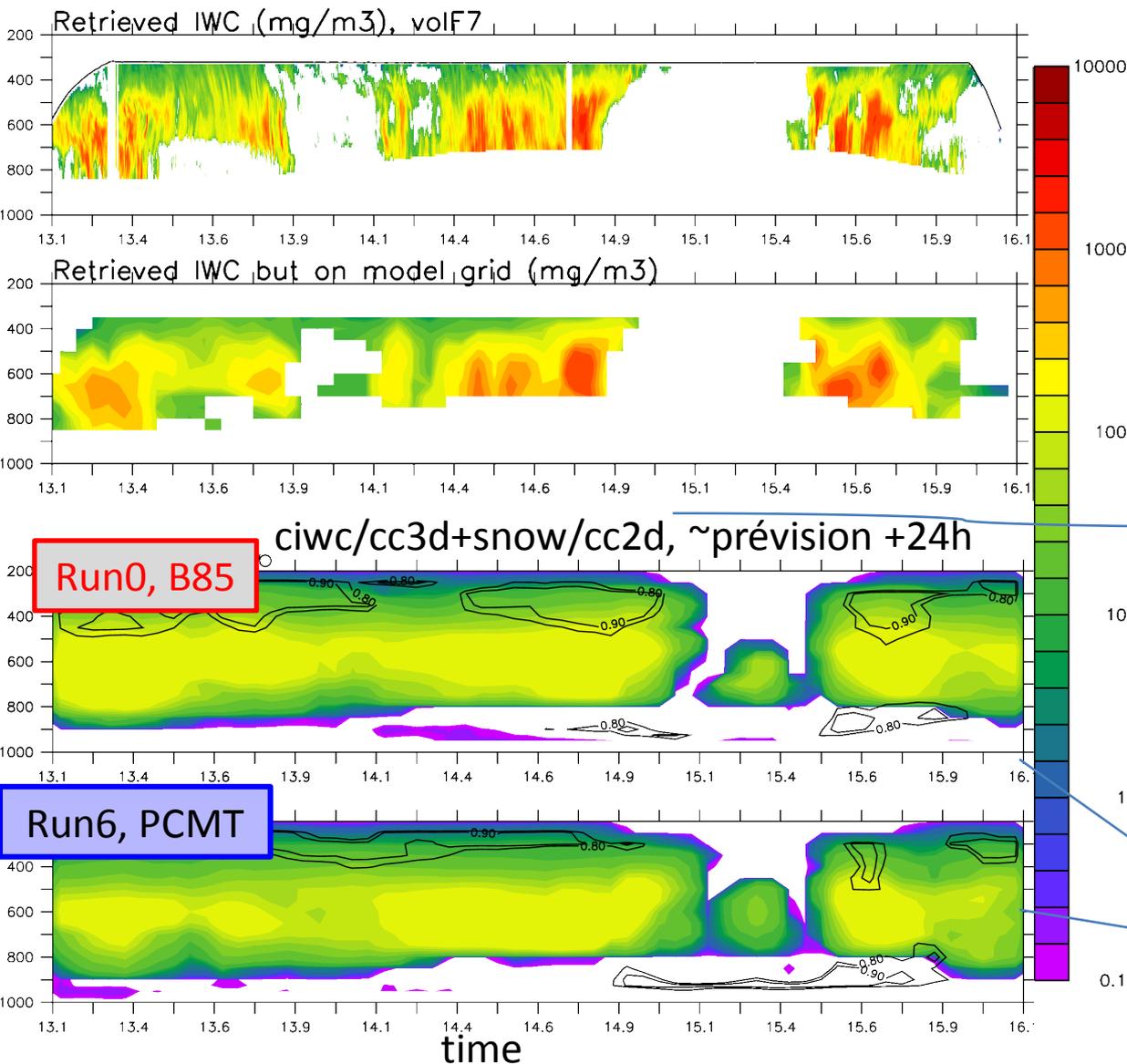
## Partie 2:

- Influence de la diffusion horizontale dans Arpege sur la formation du blocage

Utilisation de sorties toutes les 15 minutes: Pour un vol de 3 heures, utilisation de 12 échéances

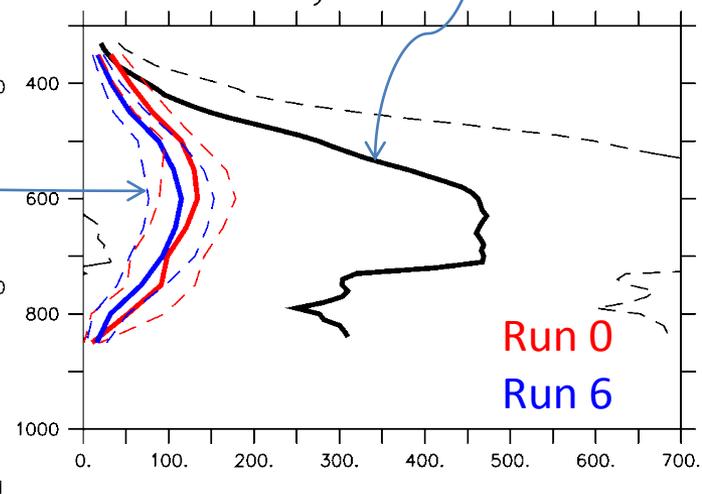


# Coupes verticales le long du vol du contenu en glace (nuage et precip)



Obs (retrieved IWC from radar/lidar; Delanoë and Hogan, 2008; Cazenave, 2018)

IWC là ou il y a des obs



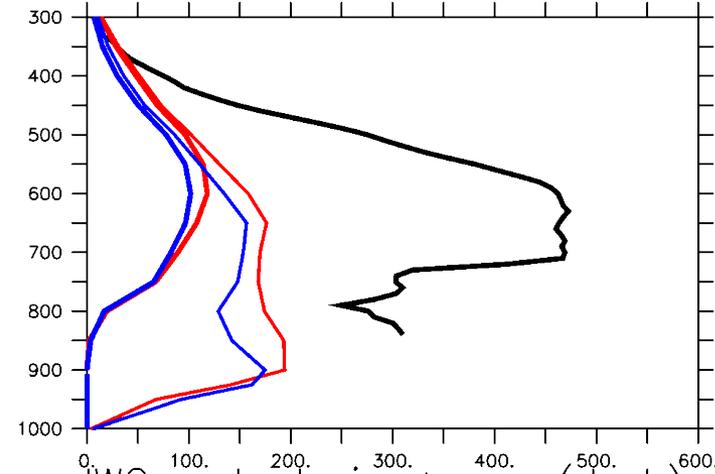
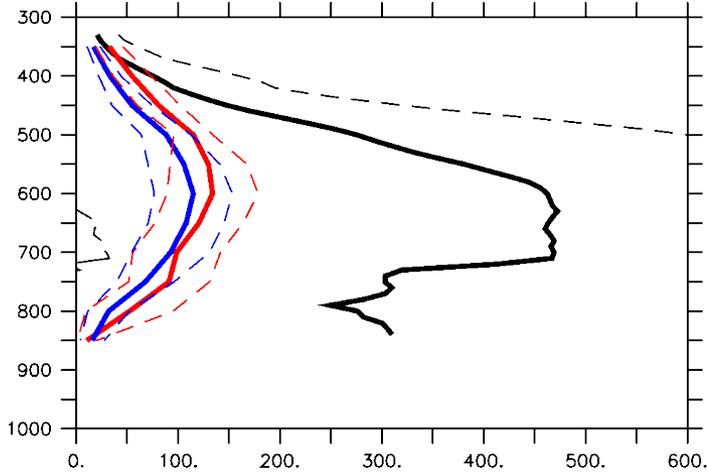
3 heures de vol: 12  
plages

# Contenu en glace (nuage et precip), vol F7

VoIF7, 0 LAST00<sub>0</sub>6, 6 LAST00<sub>0</sub>6, 20161001H12P, +25h to +28.25h

IWC partout  $ciwc/cc3d+snow/cc2d$  (thick)  
 $(ciwc+clwc)/cc3d+(snow+rain)/cc2d$  (thin)

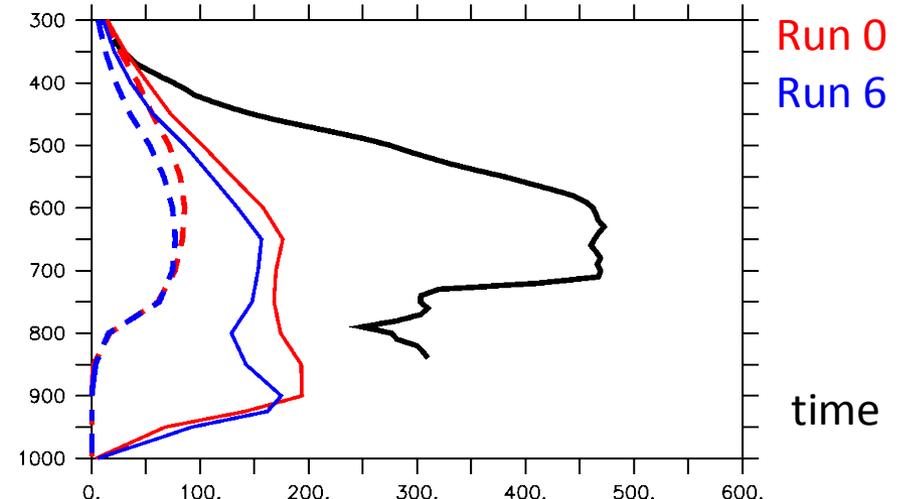
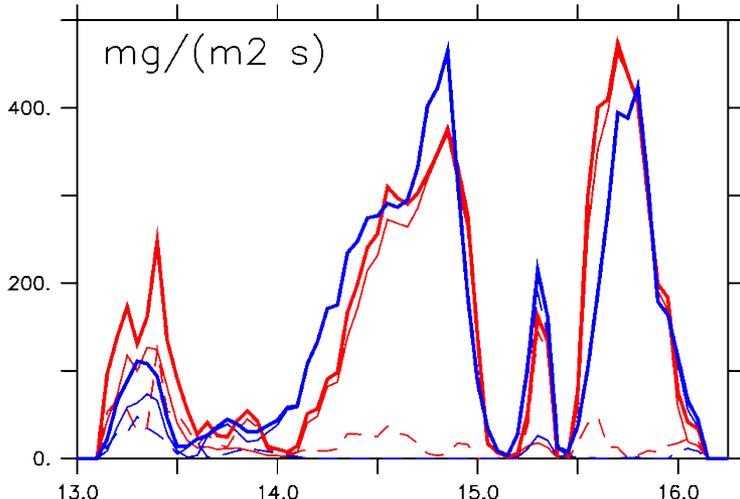
IWC (mg/m<sup>3</sup>) la ou il y a des obs



IWC partout  $ciwc+snow$  (dash)

conv prec (---), ls prec (-), sum (thick)

$(ciwc+clwc)/cc3d+(snow+rain)/cc2d$

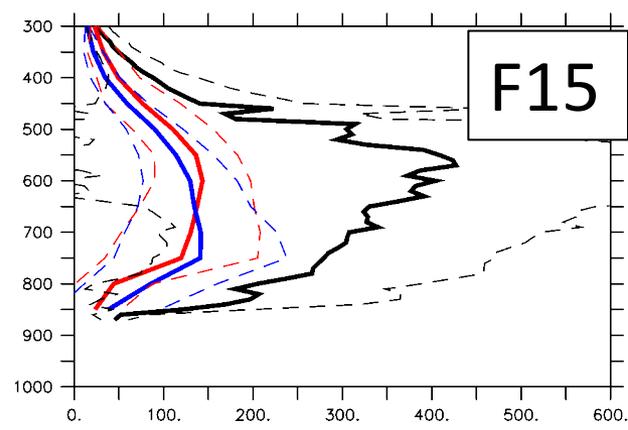
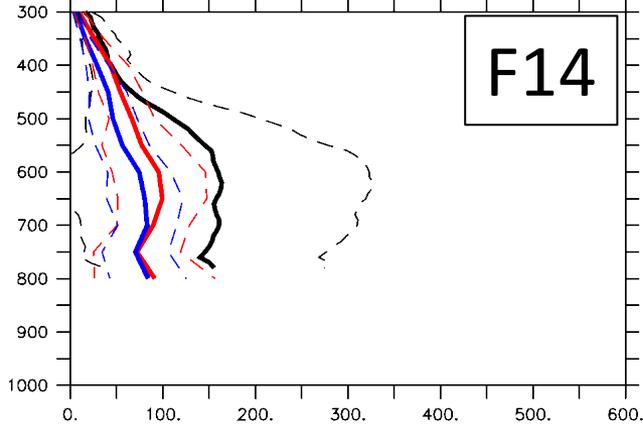
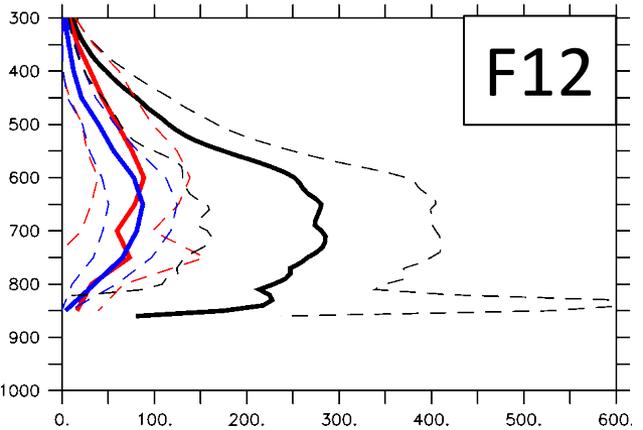
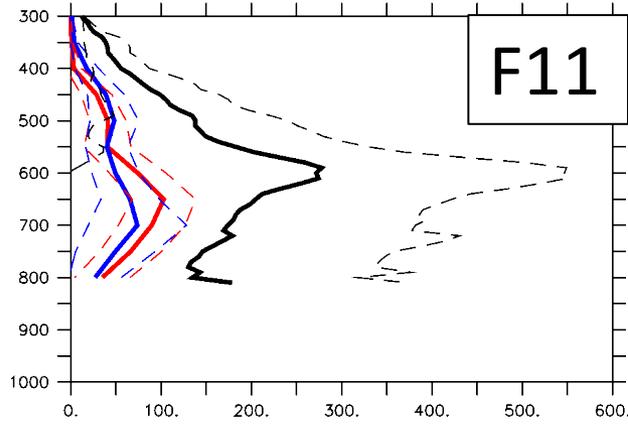
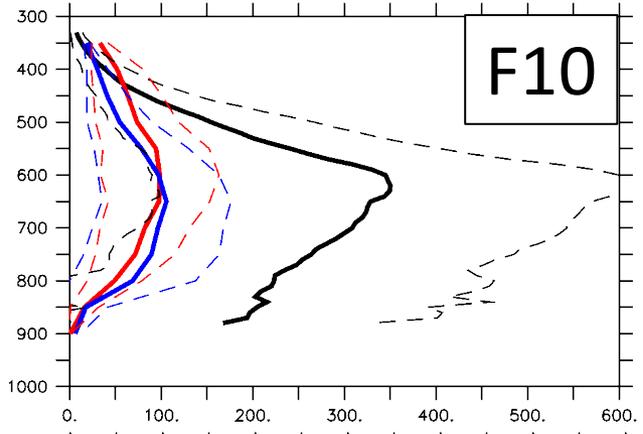
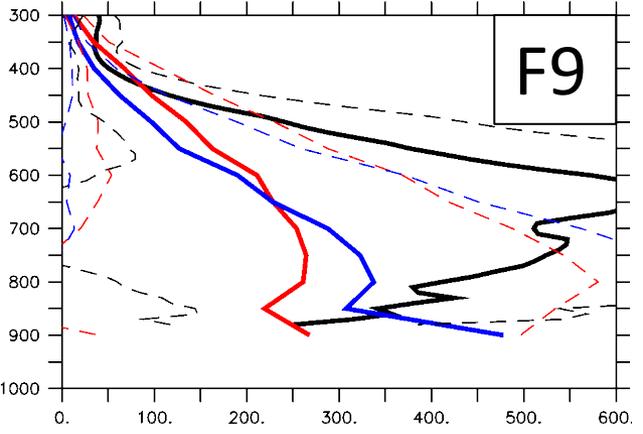
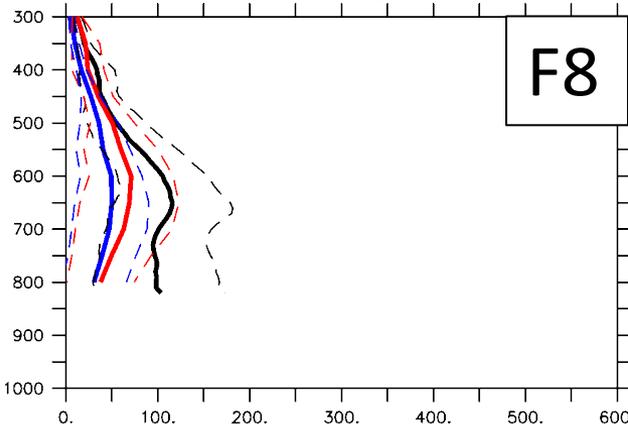
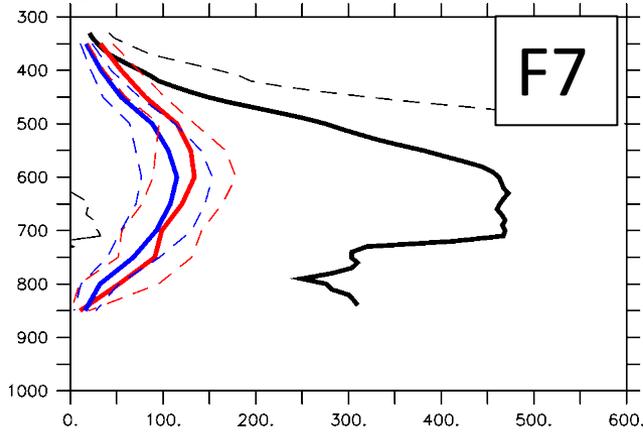
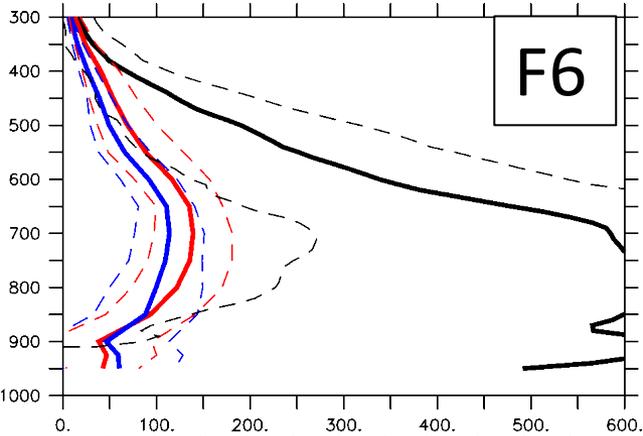


time

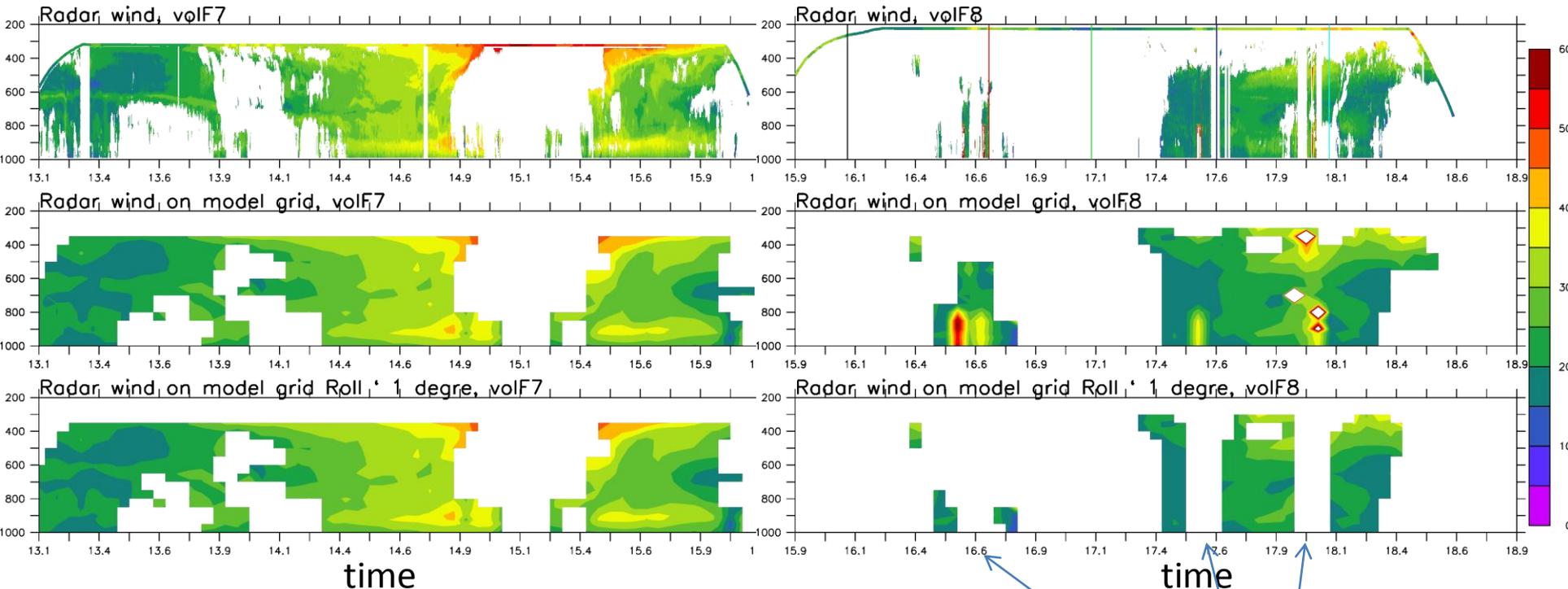
# Contenu en glace (nuage et precip)

Run 0

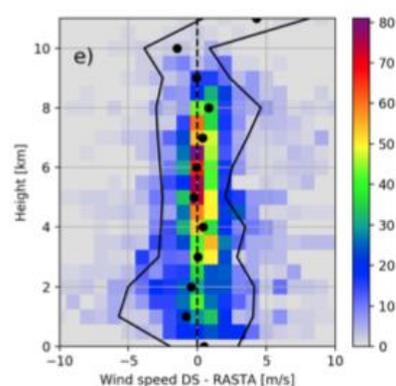
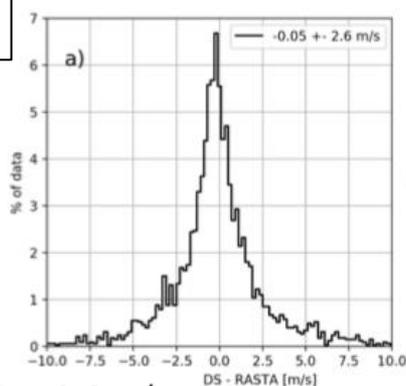
Run 6



# Coupes verticales le long du vol de la vitesse du vent horizontal issue de RASTA



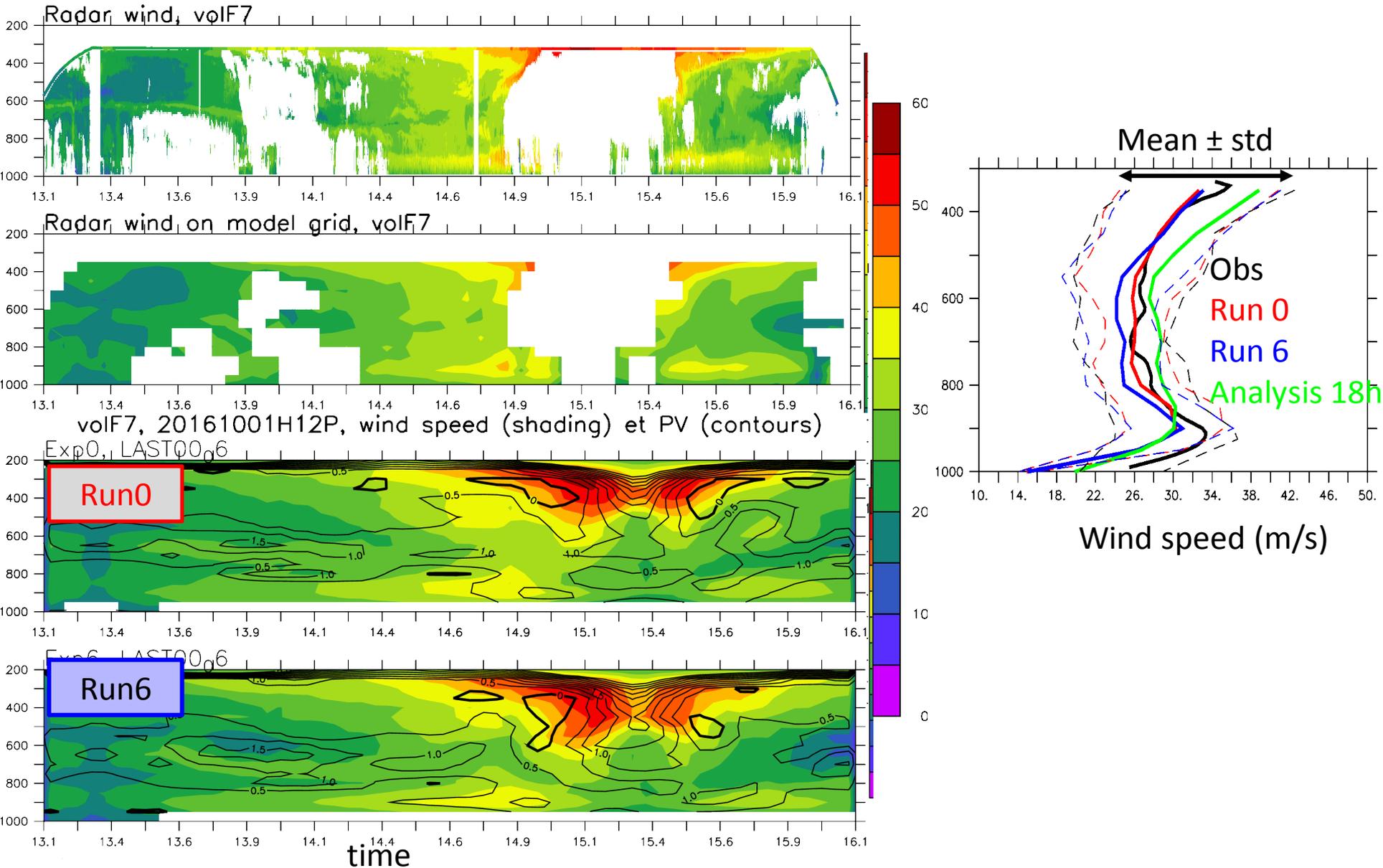
DS vs RASTA



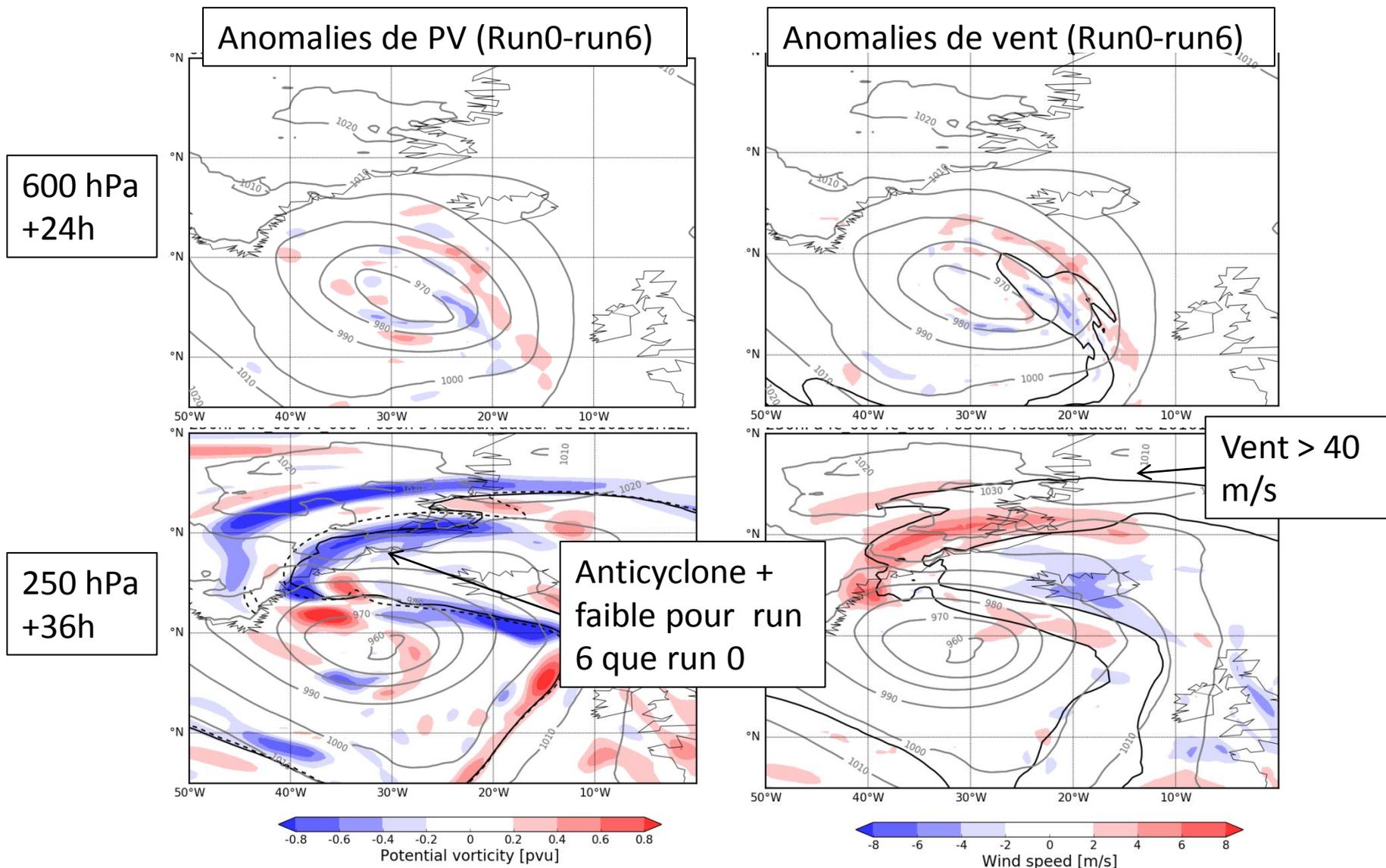
Suppression des moments où l'avion tourne

Wind speed: 0.05 +- 2.6 m/s  
 Wind direction: -2.05 +- 7.47 °

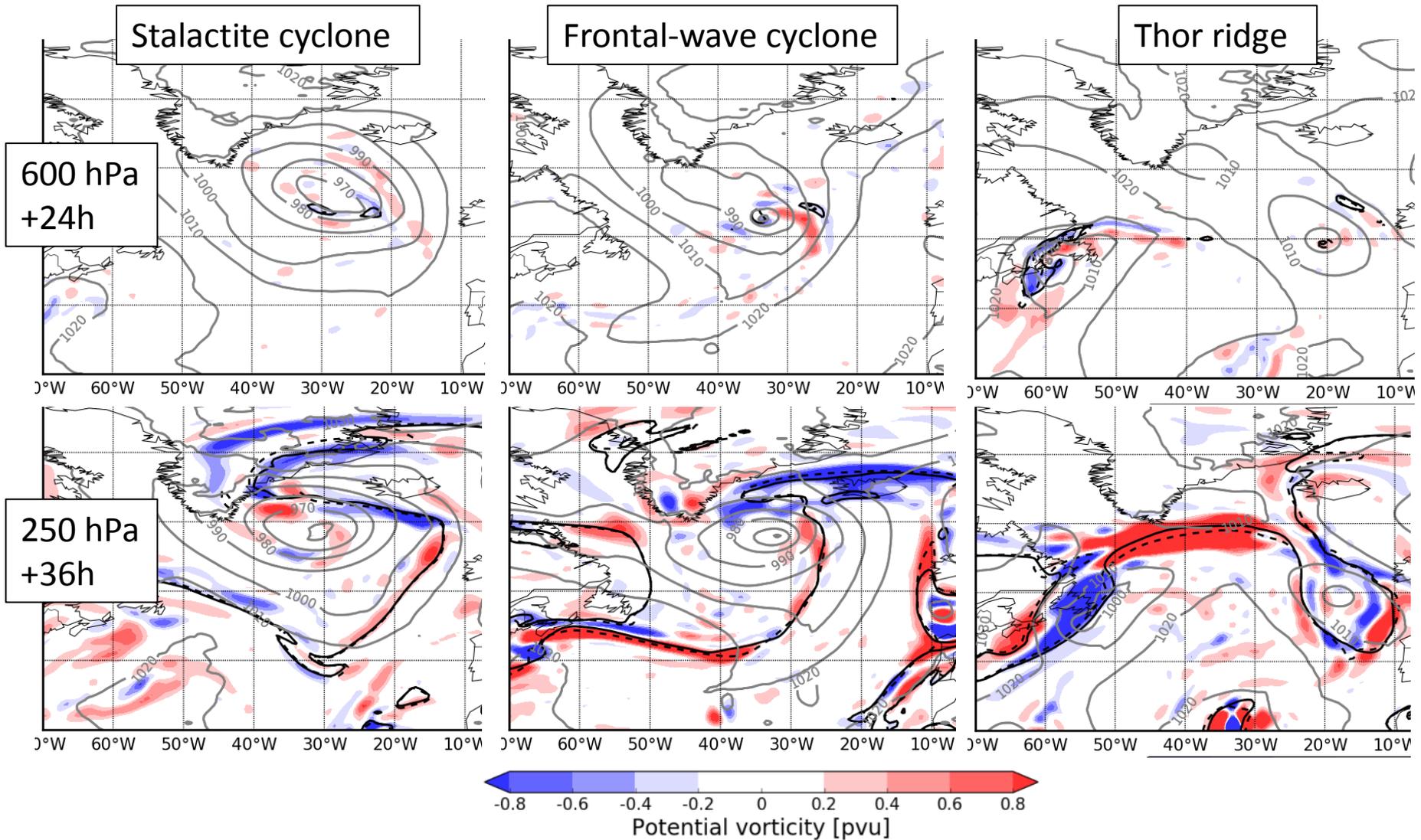
# Coupes verticales le long du vol de la vitesse du vent horizontal



# Anomalies de vorticité potentielle et de vitesse de vent pour la dépression Stalactite



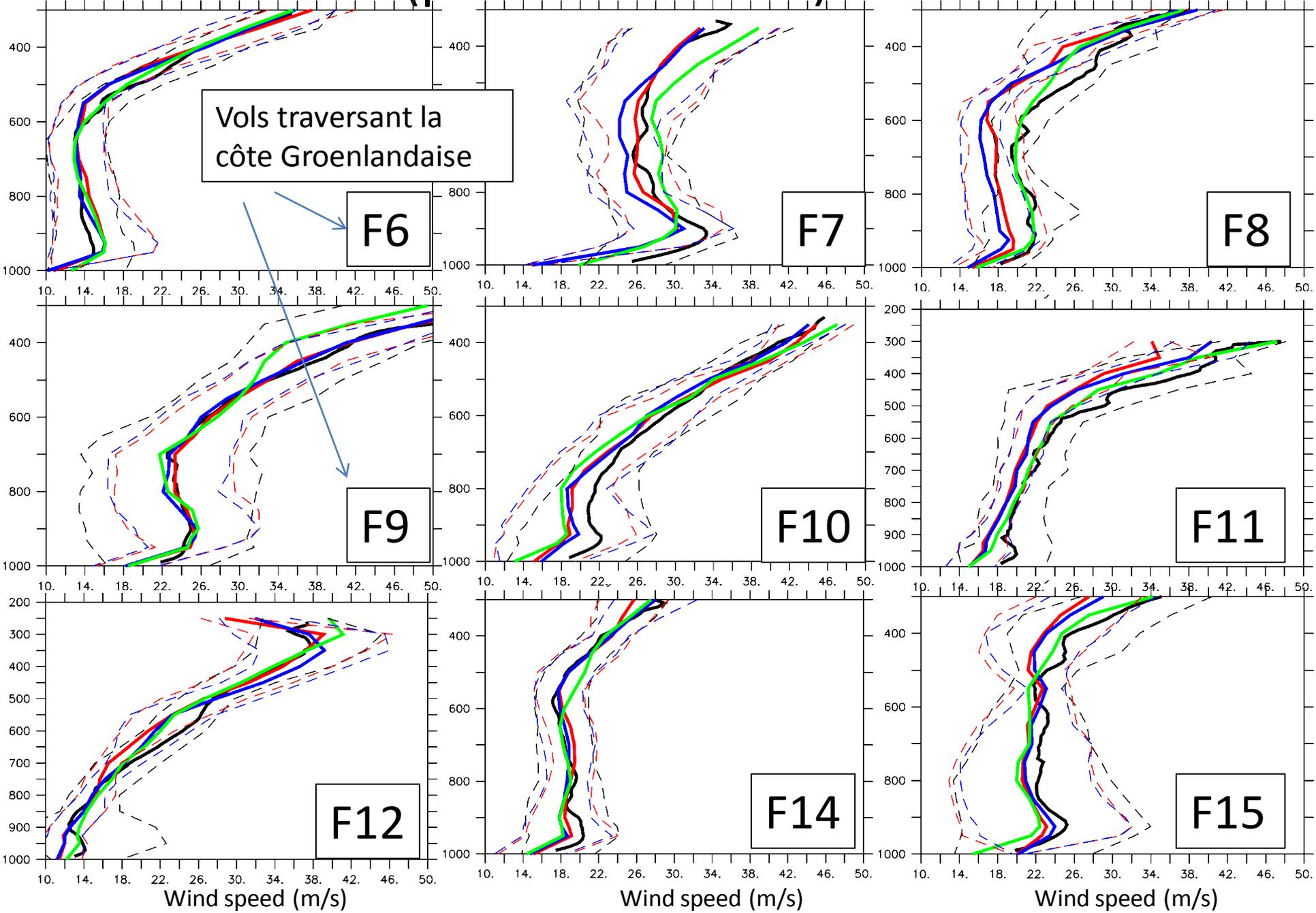
# Anomalies de PV pour 3 cas (run 0 – run 6)



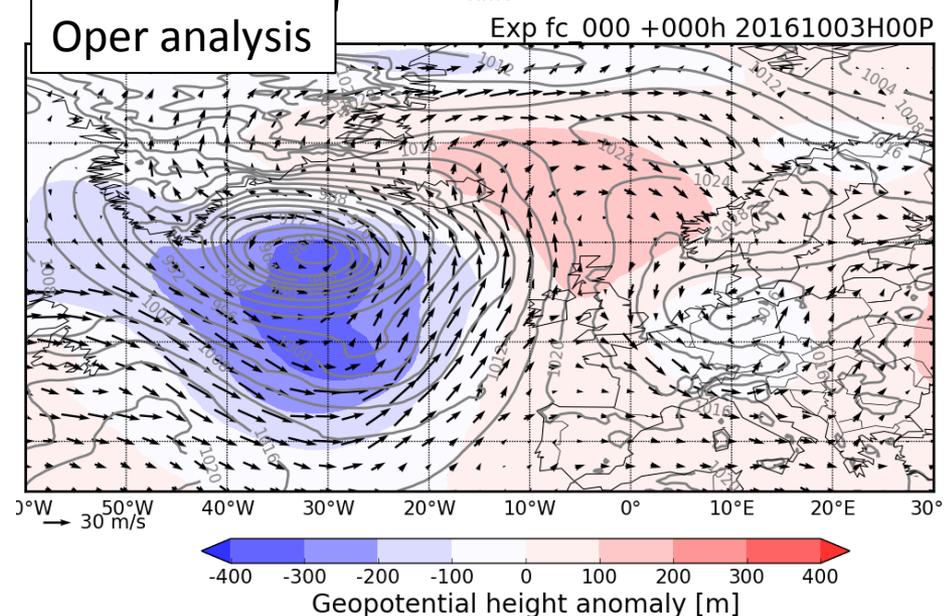
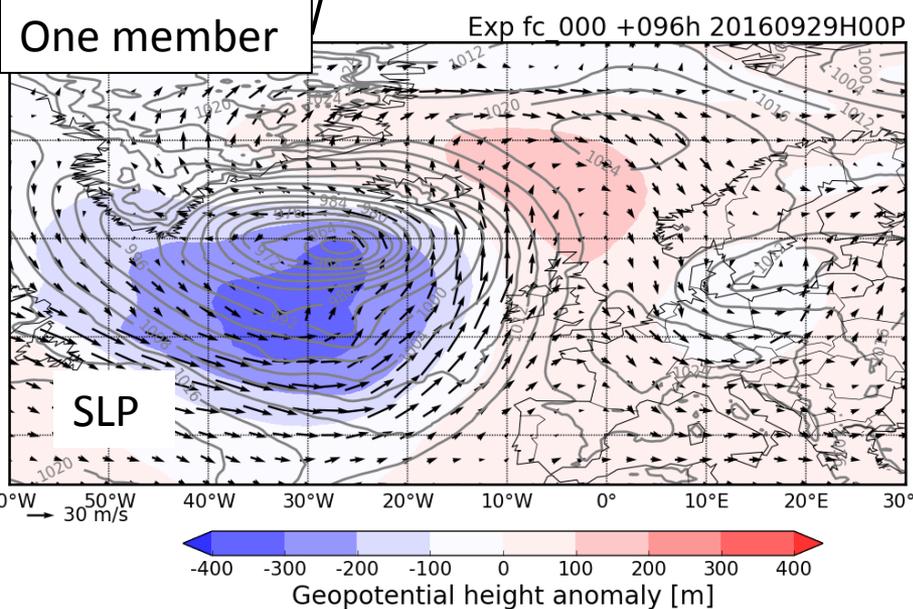
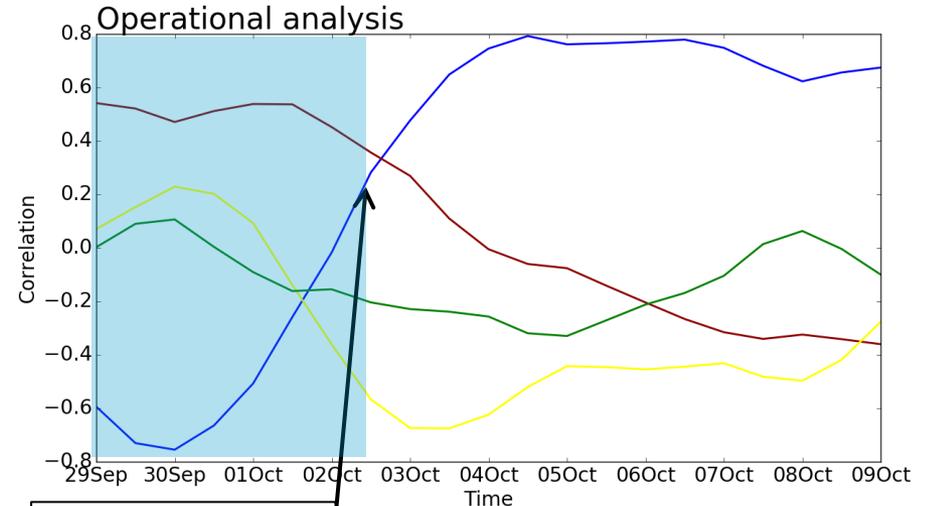
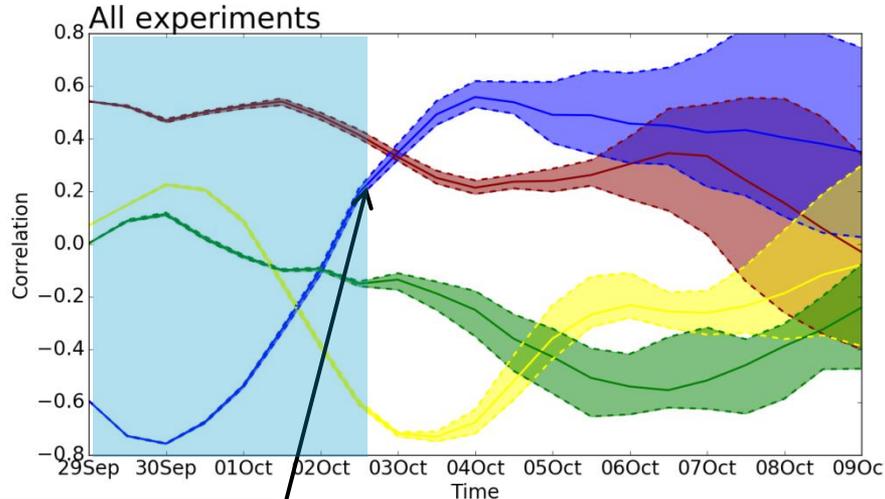
Anticyclone d'altitude + marqué pour le run 0 pour les 2 cas de dépressions creuses mais pas pour la dépression d'intensité modérée

# Vitesse de vent (prévision à ~24h)

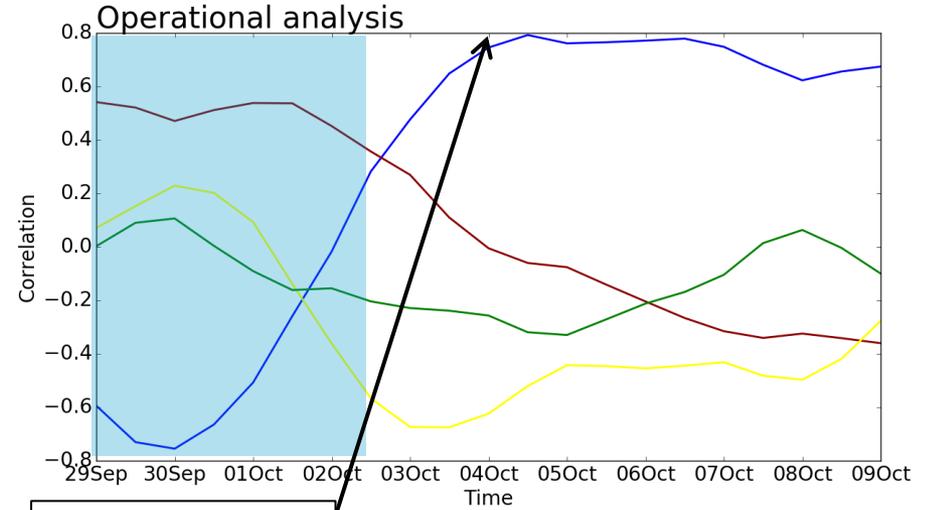
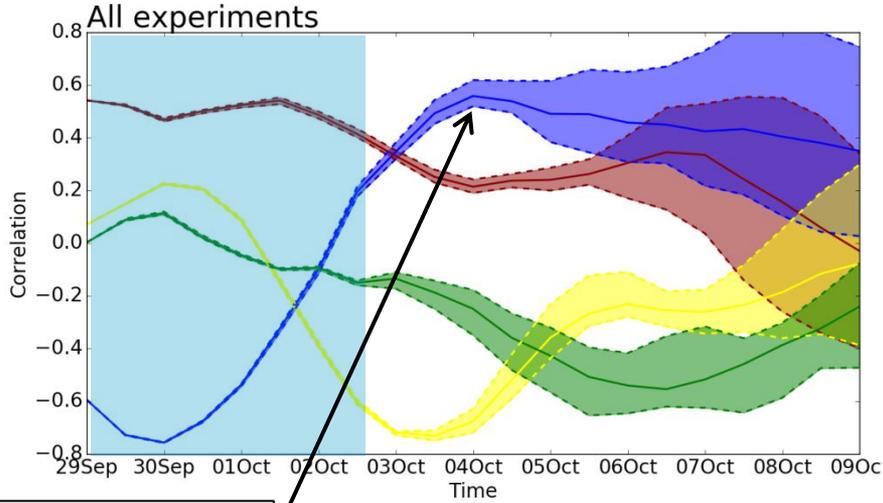
Obs Run 0 Run 6 Analysis



# Part II: Medium-range predictability of the Scandinavian blocking



# Medium-range predictability of the Scandinavian blocking

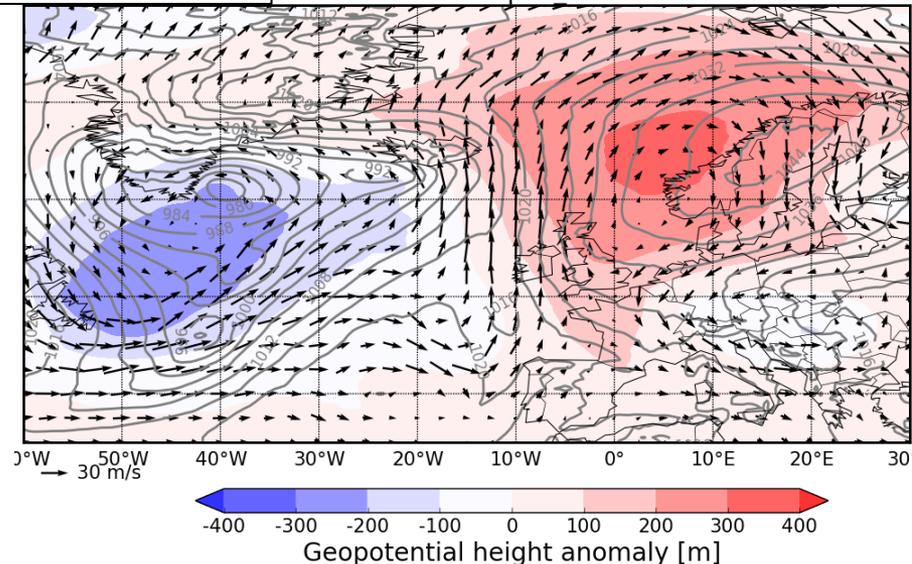
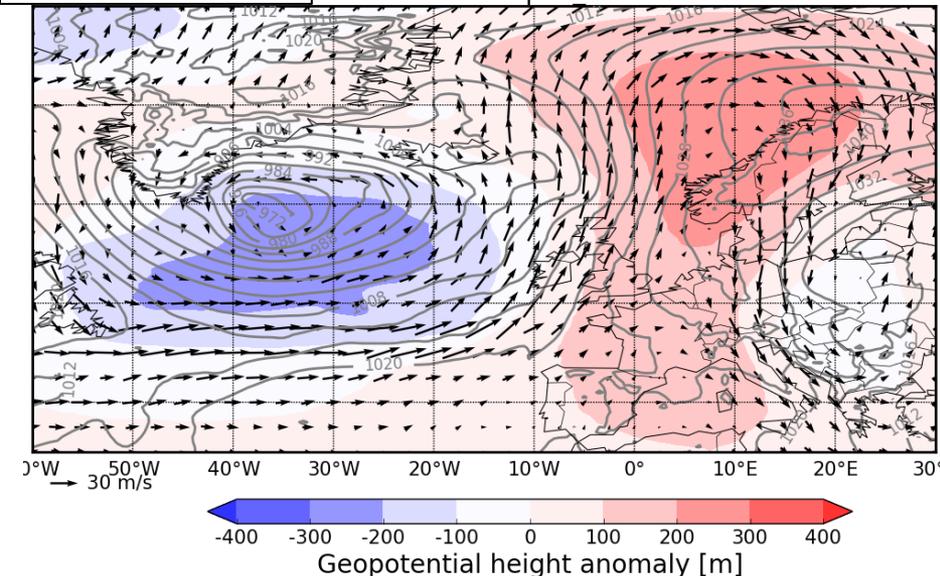


One member

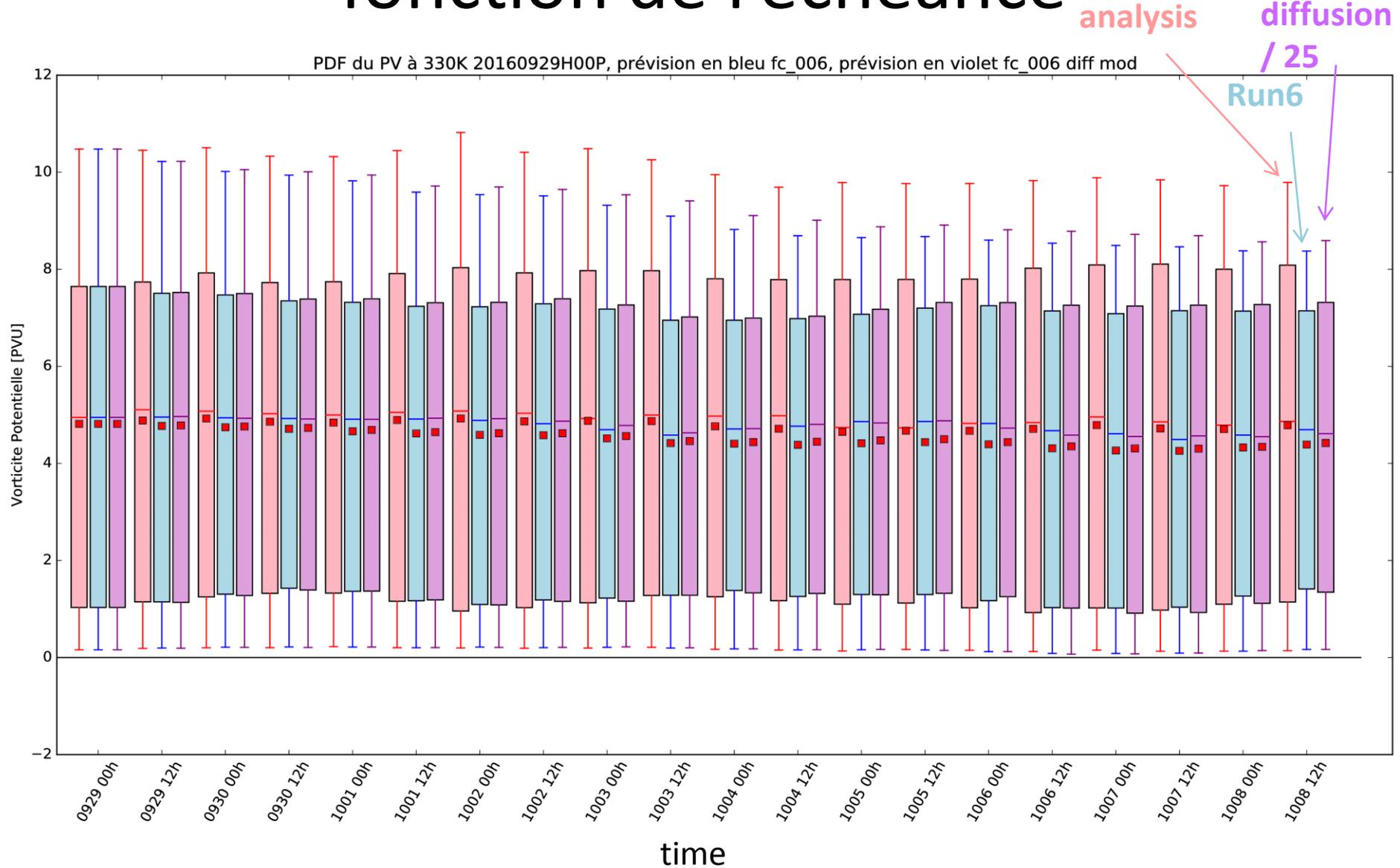
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Oper analysis

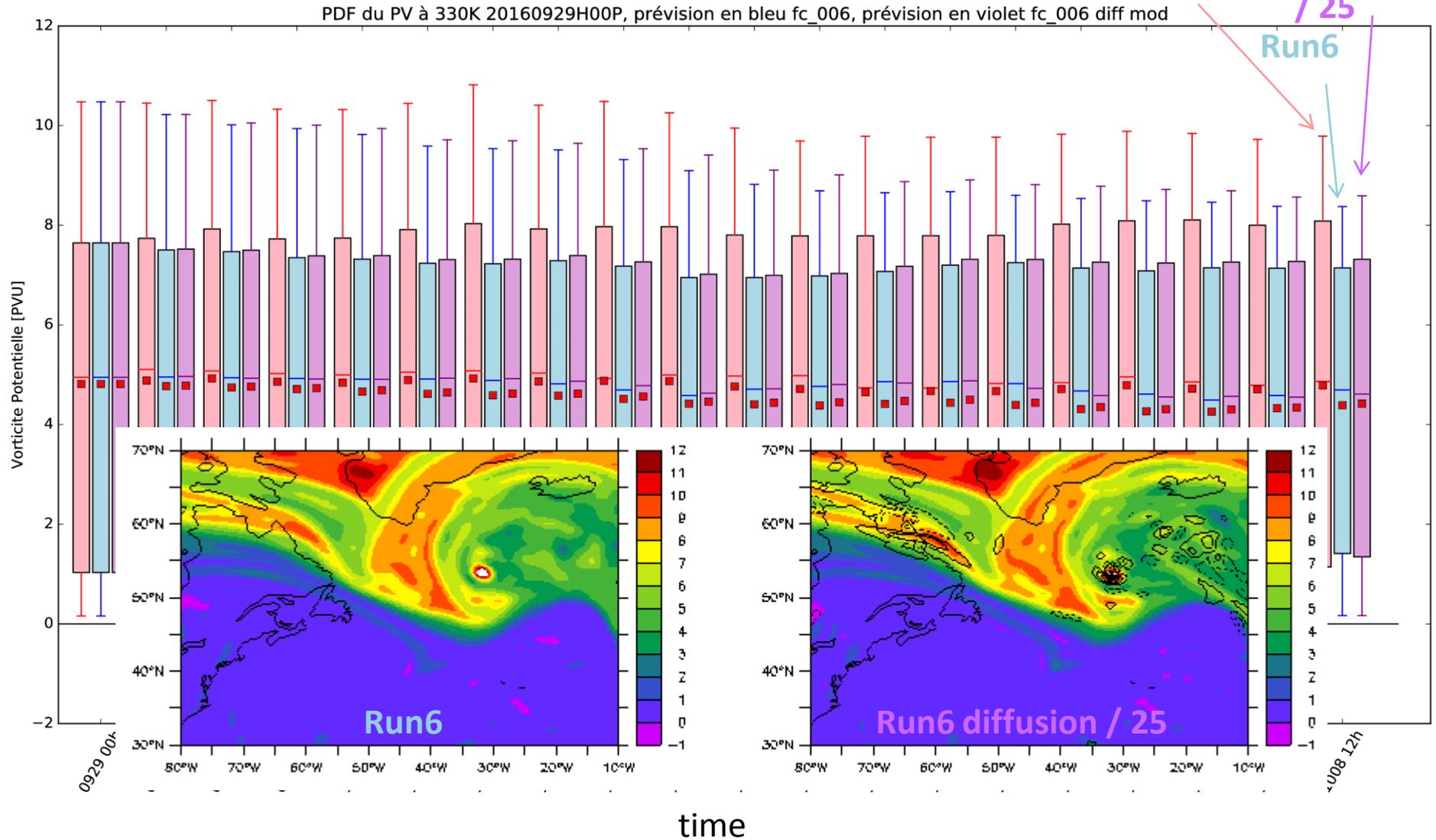
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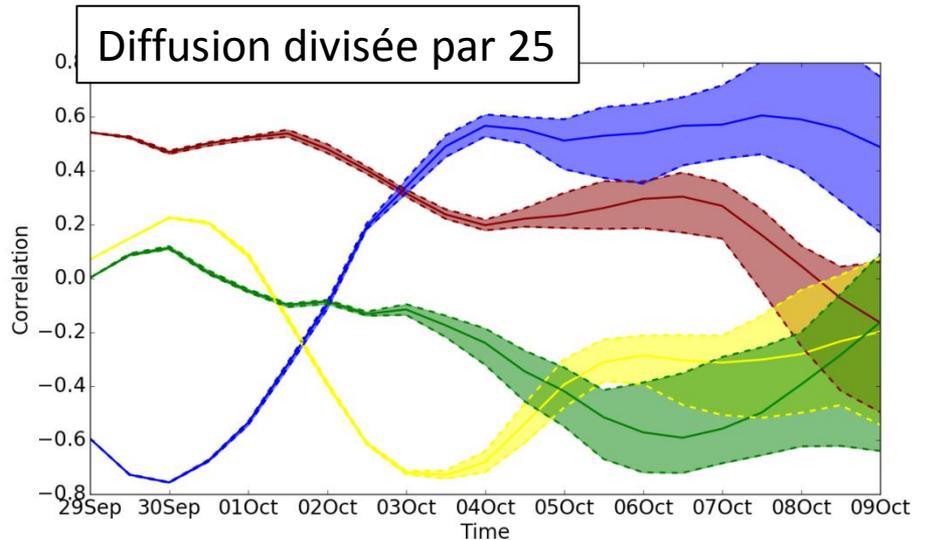
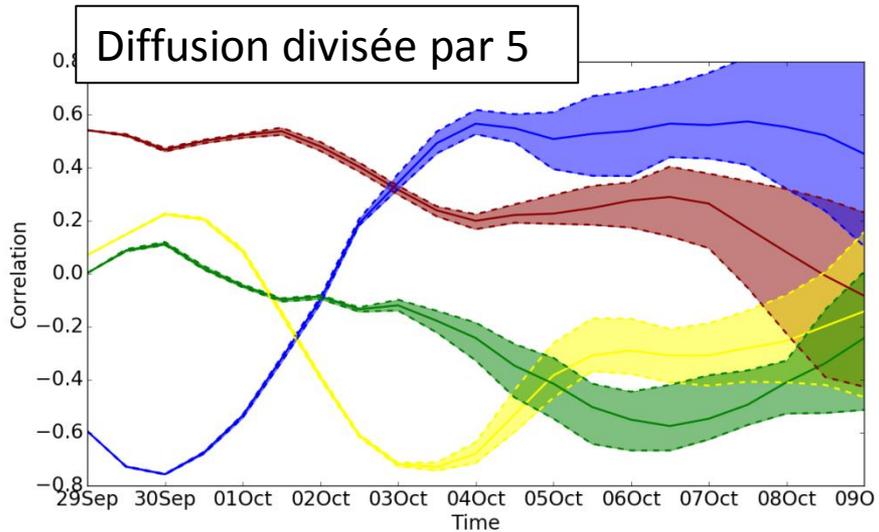
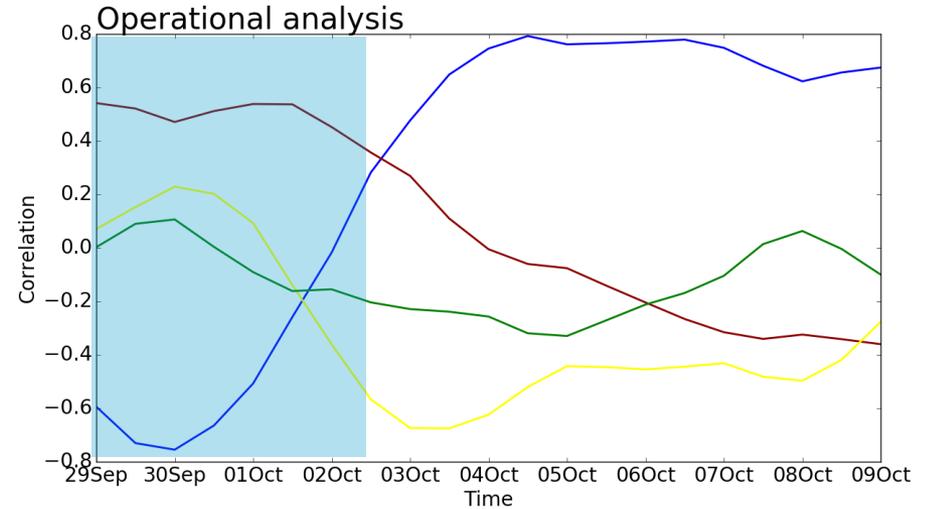
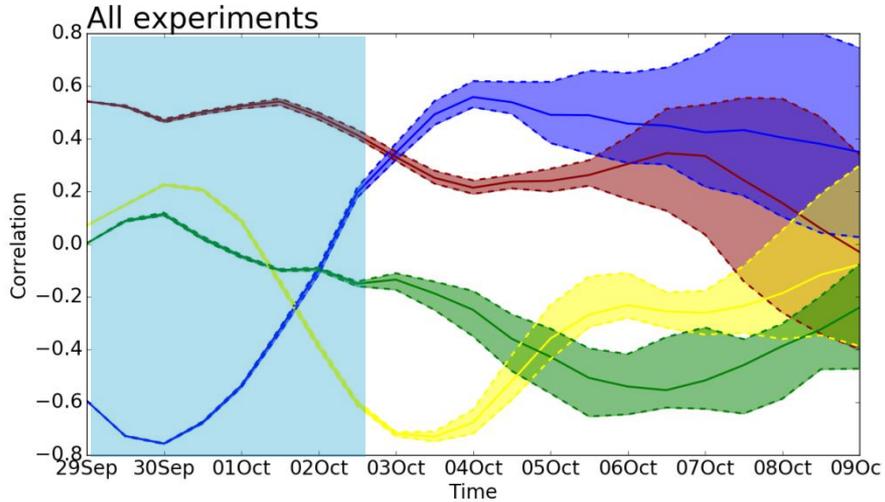
# Statistiques du PV sur isentrope en fonction de l'échéance



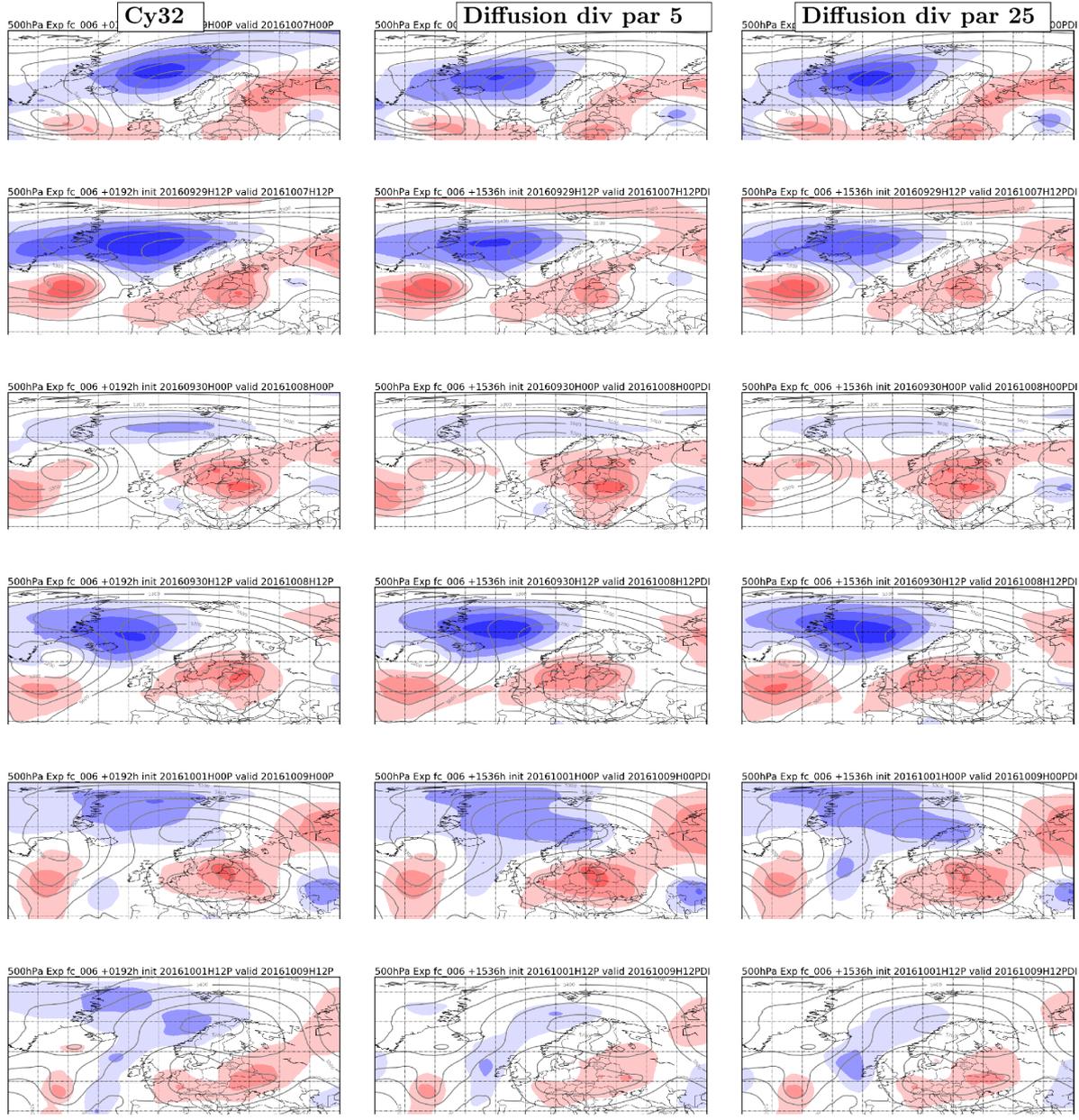
# Statistiques du PV sur isentrope en fonction de l'échéance



# Medium-range predictability of the Scandinavian blocking



# Anomalies par rapport à l'analyse



# Conclusions préliminaires

## Partie 1:

- Sous-estimation du contenu en glace dans Arpege + sous-estimation quasi-systématique du module du vent entre 600 hPa et 800 hPa.
- Les 2 types de schéma de convection jouent sur le dégagement de chaleur latente et des différences notables arrivent vers + 24h.
- B85: un peu + de glace que PCMT et WCBs arrivent + hauts

## Partie 2:

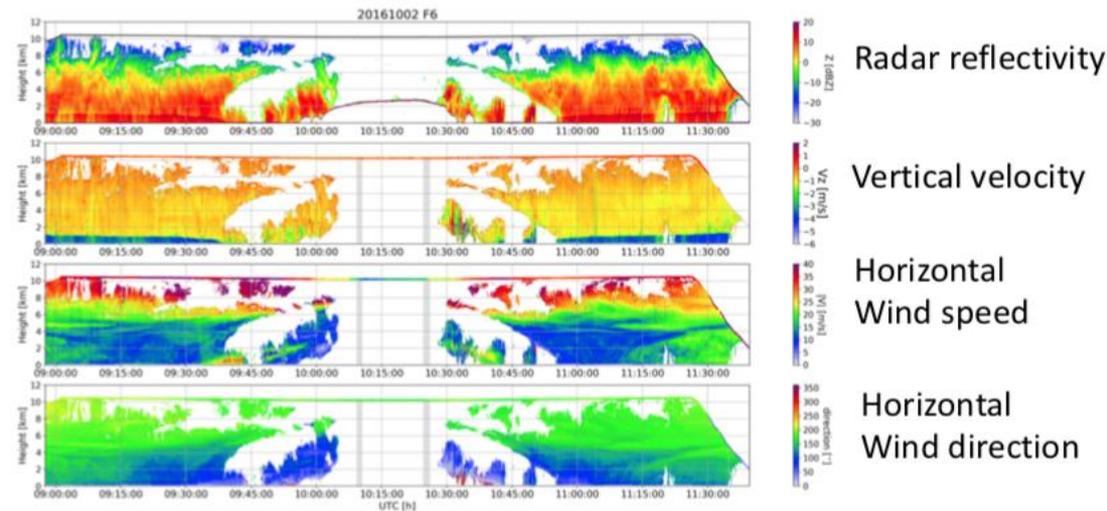
- Les forts PV en altitude diminuent avec l'échéance
- Cette diminution est en partie atténuée en diminuant la diffusion

## Travail potentiellement à faire

- Pdfs de différences de vent entre sorties de modèle et obs.
- Reprendre les comparaisons avec les dropsondes.
- Est-ce que ça vaut le coup une étude sur toute la période NAWDEX de calculs de trajectoires WCBs ? Avec Lagranto ?

# Comparison vent -RASTA

## RASTA WIND retrieval assessment



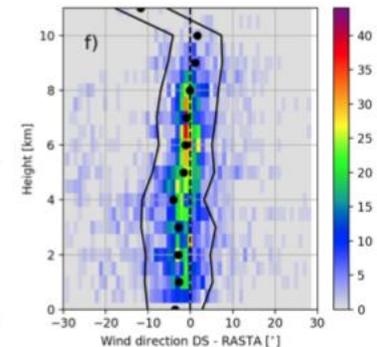
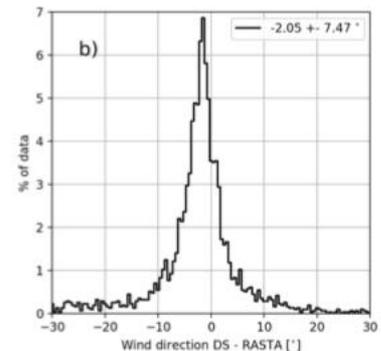
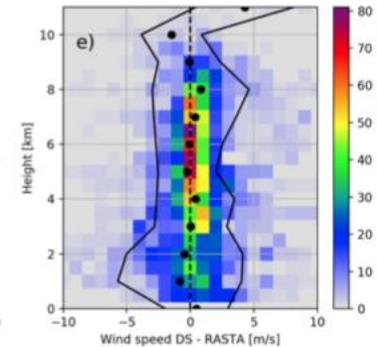
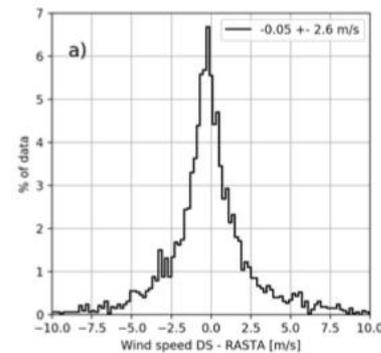
We use the dropsonde launch time with a 10s window for RASTA measurements

Wind speed:  $0.05 \pm 2.6$  m/s  
 Wind direction:  $-2.05 \pm 7.47^\circ$

Iceland: NAWDEX

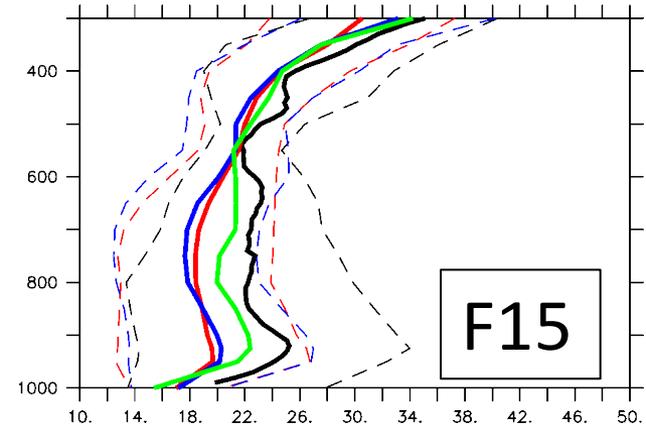
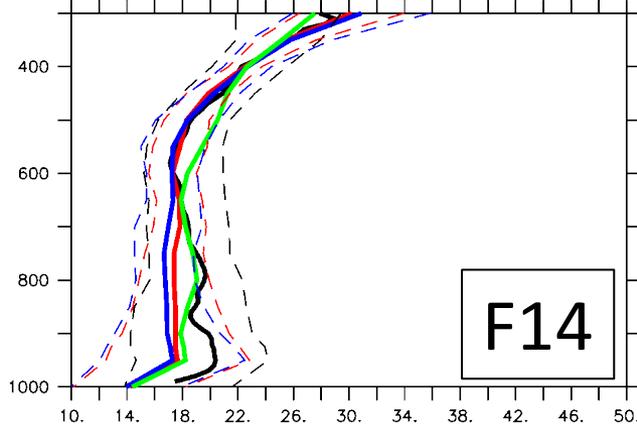
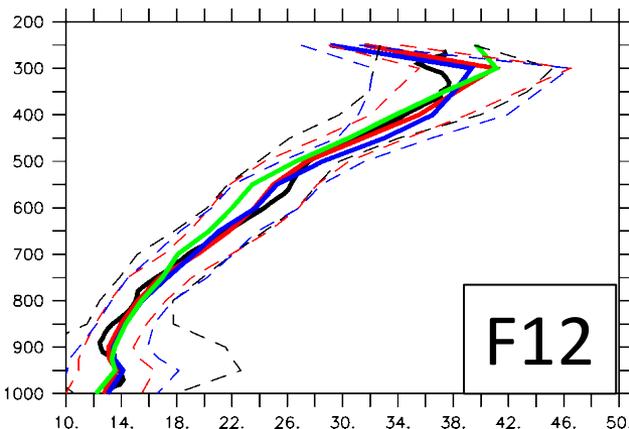
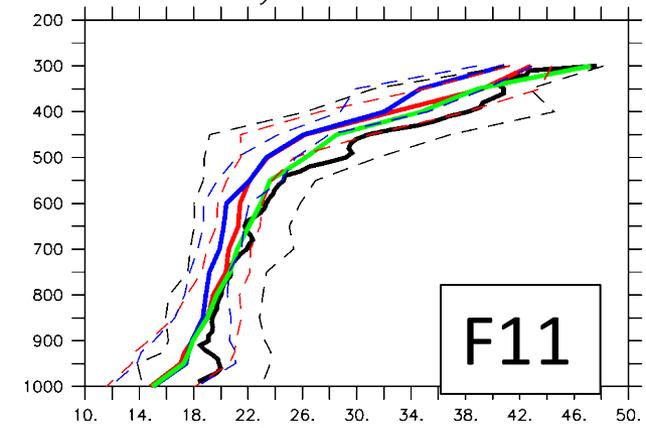
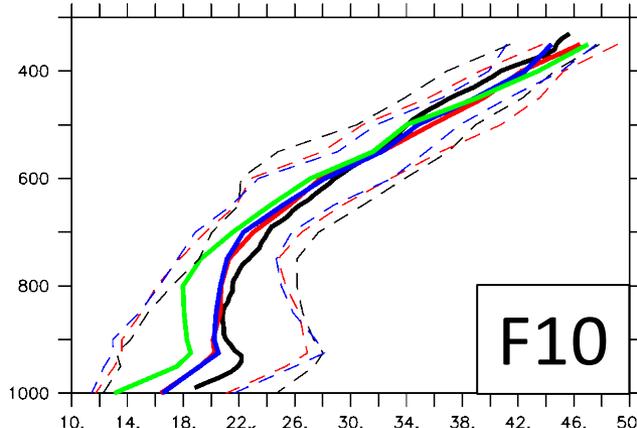
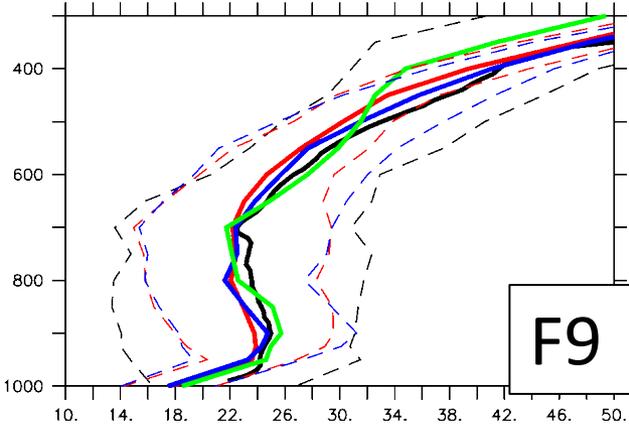
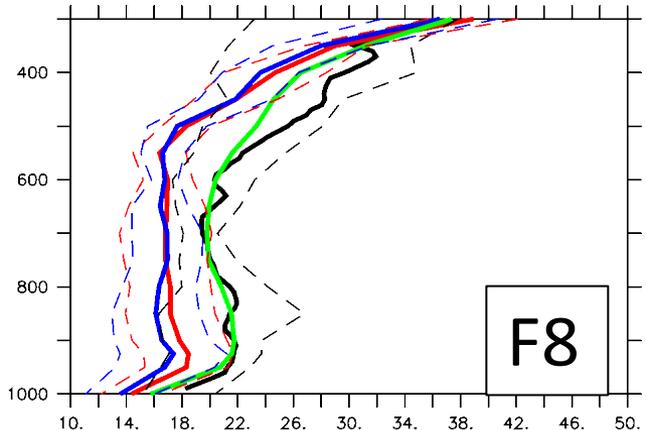
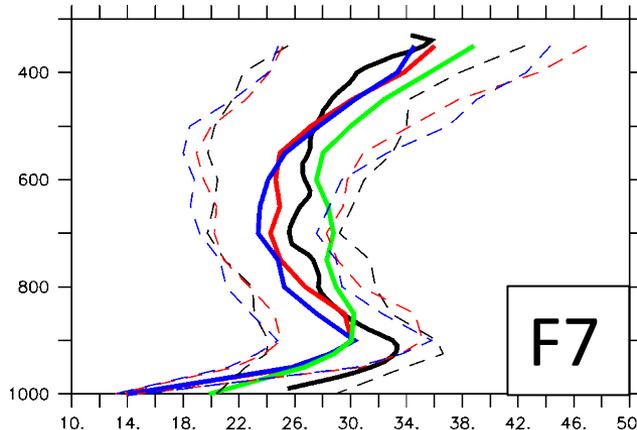
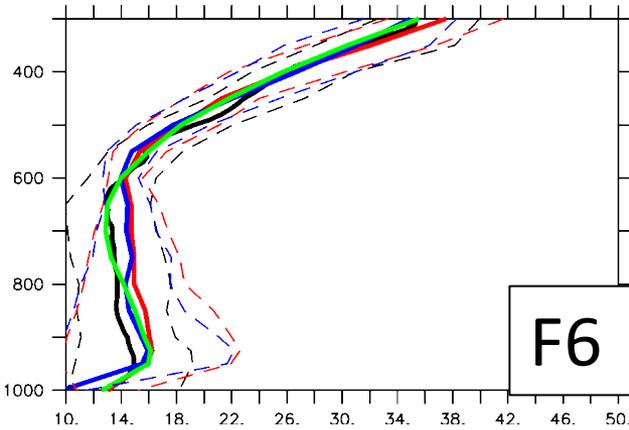
## RASTA against DS (all flights)

As a function of altitude



# Vitesse de vent (prévision à ~36h)

Obs Run 0 Run 6  
Analysis 18h



# Vitesse de vent (prévision à ~48h)

Obs Run 0 Run 6  
Analysis 18h

