

# Les vents à 10m dans une hiérarchie de simulations avec LMDZ

A. Sima, D.D. Rousseau, Y. Balkanski, M. Kageyama, G. Ramstein  
LMD & LSCE Saclay

## Approche

Vents de reference : u10m et v10m (6h) du modèle ECMWF

Intervalle analysé : 1990-1999

Simulations : LMDZOR, forcées par SSTs AMIP interannuelles

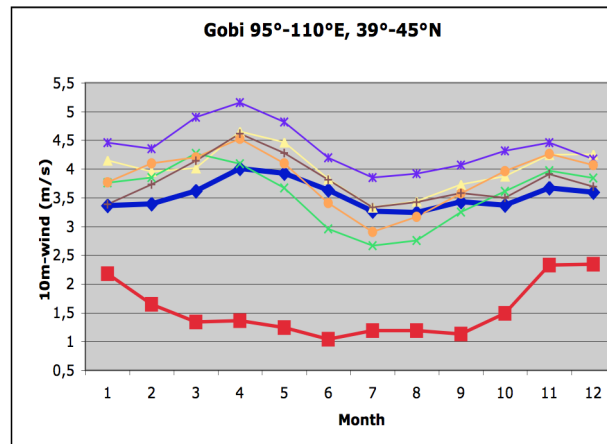
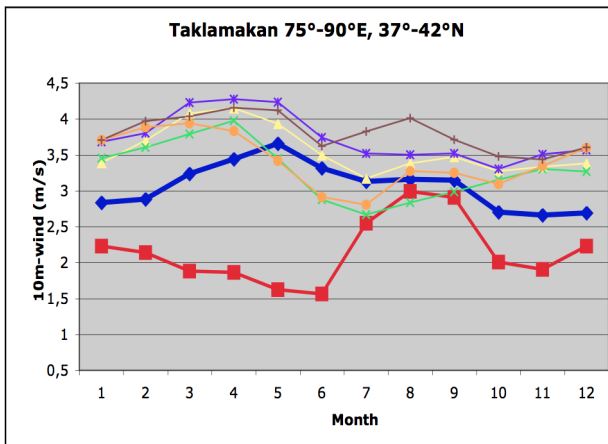
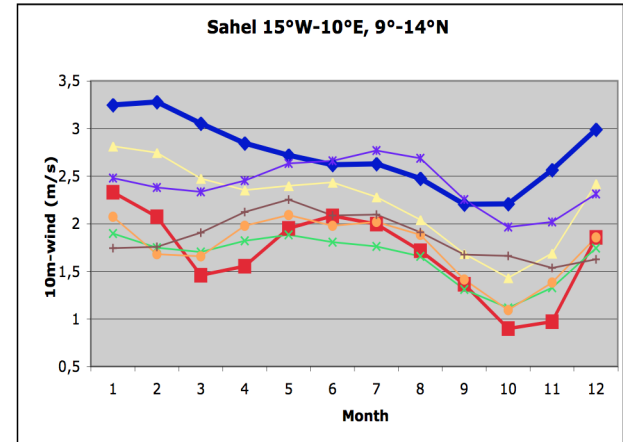
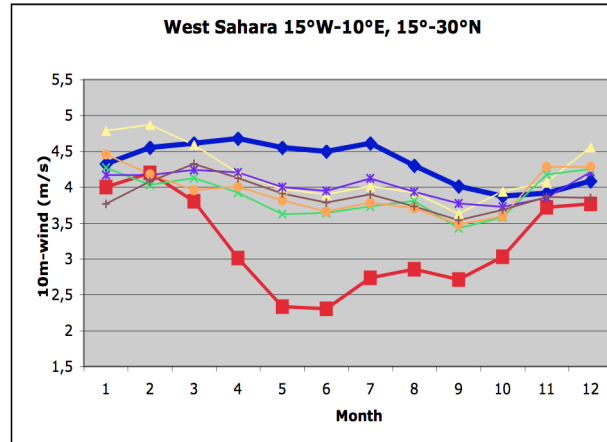
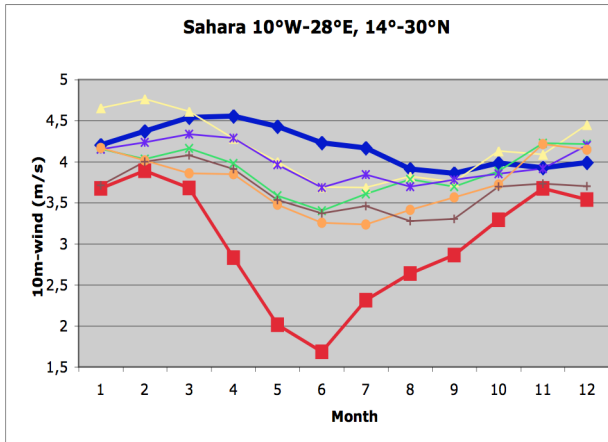
	L19	L39	
96 x 95	AP	AP	NP
144 x 142	AP	AP	NP

Régions : Sahara, W.Sahara, Sahel, Taklamakan, Gobi

Aspects analysés :

- cycle saisonnier des vents
- distribution des vents par classe de vitesse
- impact sur l'émission de poussière

# Results (1) : Annual cycle of 10m-wind LMDZ all simulations vs. ECMWF



**ECMWF 320 x 160**

**LMDZ4\_AR5 96 x 95 x 19**

**LMDZ4 96 x 95 x 39**

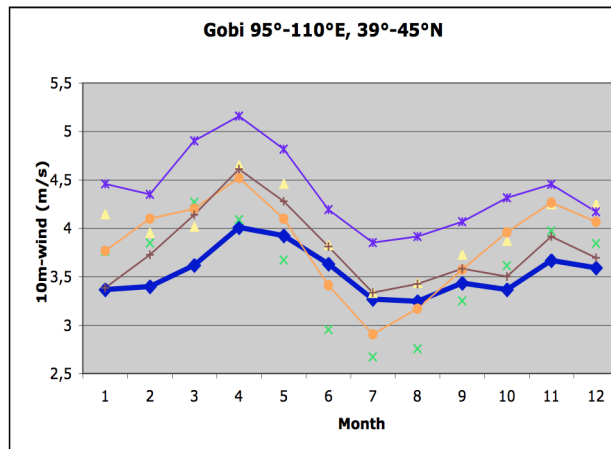
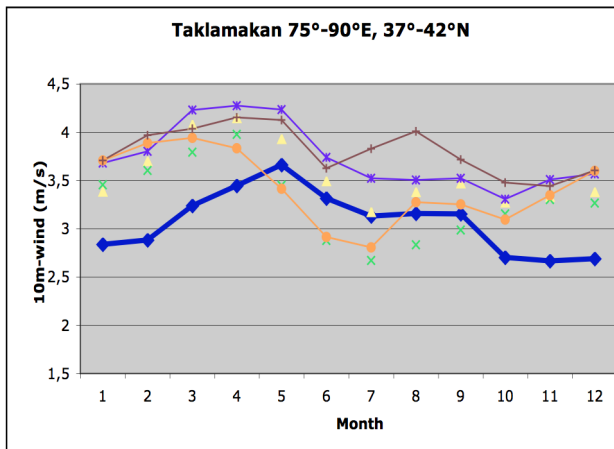
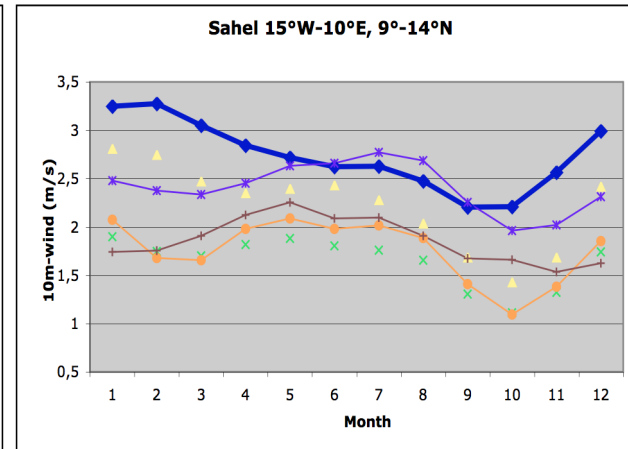
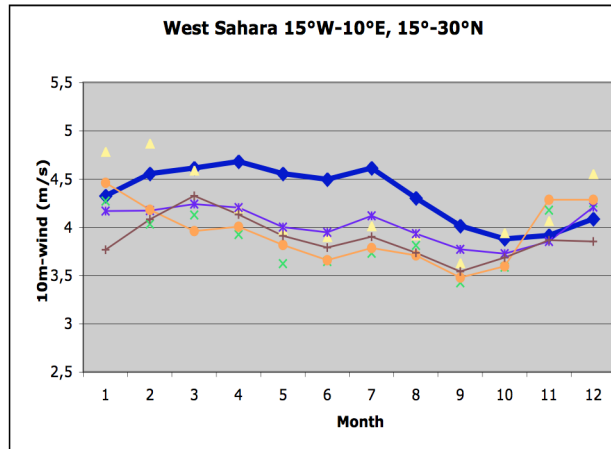
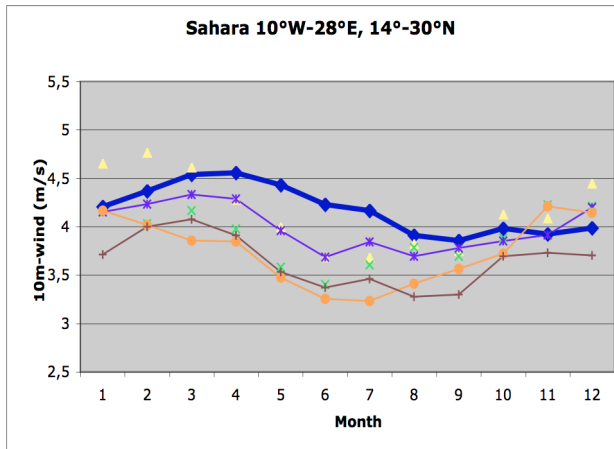
**LMDZ4 96 x 95 x 39 NP**

**LMDZ4 144 x 142 x 19**

**LMDZ5 144 x 142 x 39**

**LMDZ5 144 x 142 x 39 NP**

## Results (2) : Annual cycle of 10m-wind « BEST OF » LMDZ vs ECMWF



**ECMWF 320 x 160**

LMDZ4\_AR5 96 x 95 x 19

**LMDZ4 96 x 95 x 39**

**LMDZ4 96 x 95 x 39 NP**

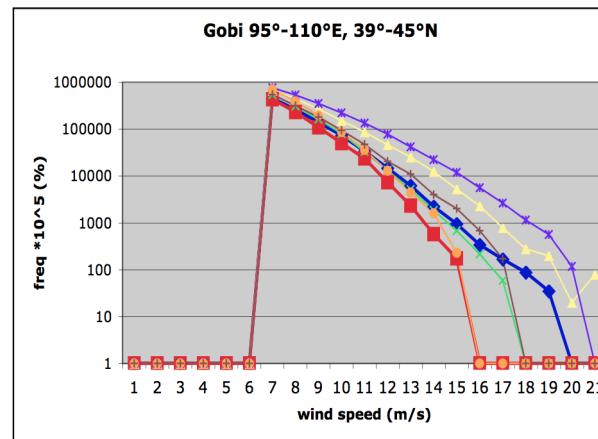
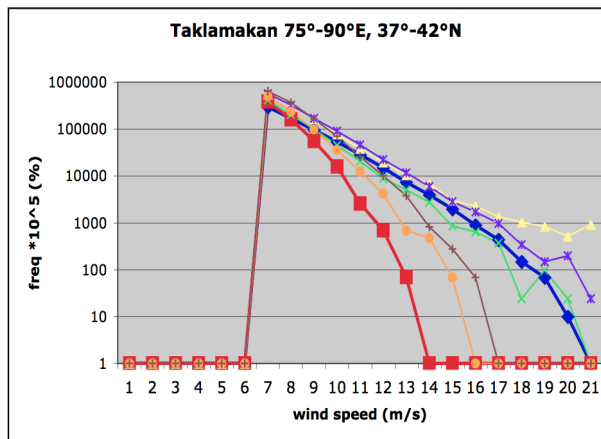
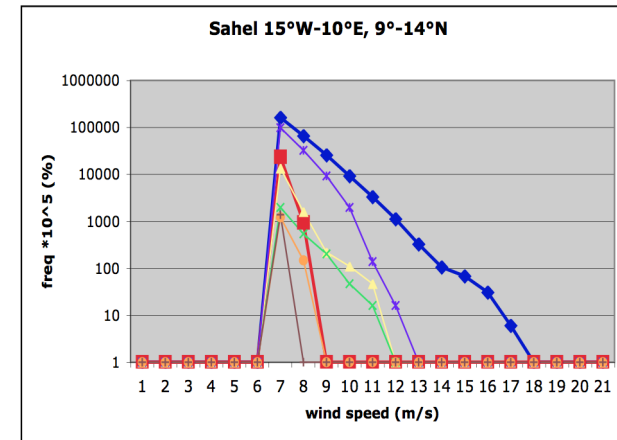
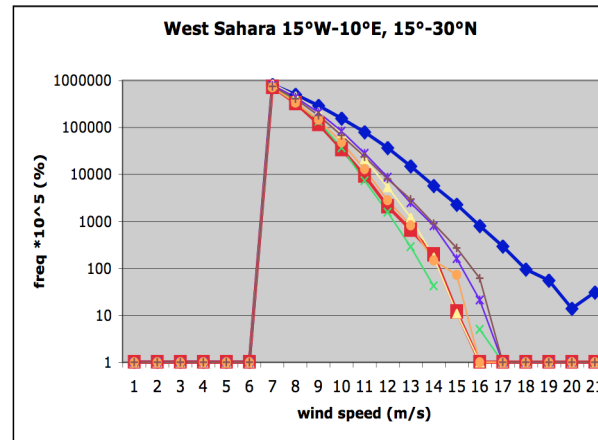
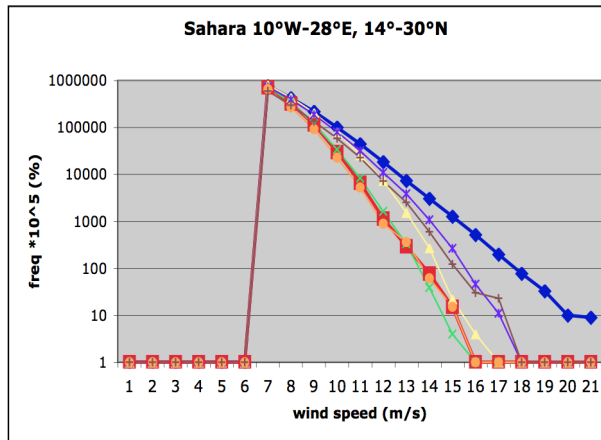
LMDZ4 144 x 142 x 19

LMDZ5 144 x 142 x 39

**LMDZ5 144 x 142 x 39 NP**

## Results (3) : Distribution of « dust-efficient » 10m-wind speed (6h data) LMDZ all simulation vs ECMWF

One condition for « dust-efficient » wind : 10m-wind > constant wind threshold (7m/s)



**ECMWF 320 x 160**

**LMDZ4\_AR5 96 x 95 x 19**

**LMDZ4 96 x 95 x 39**

**LMDZ4 96 x 95 x 39 NP**

**LMDZ 144 x 142 x 19**

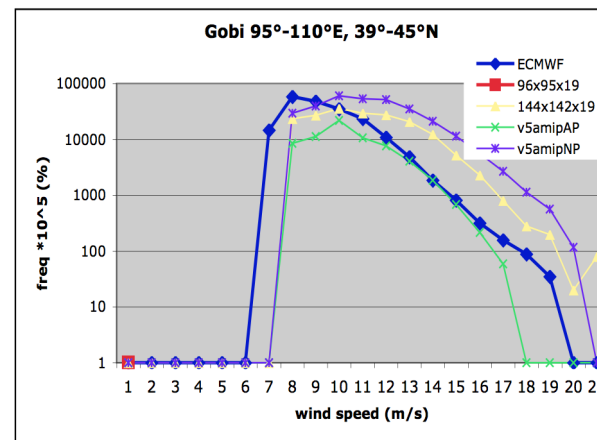
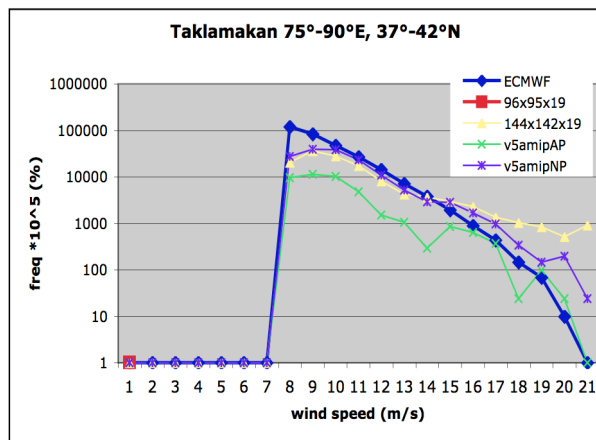
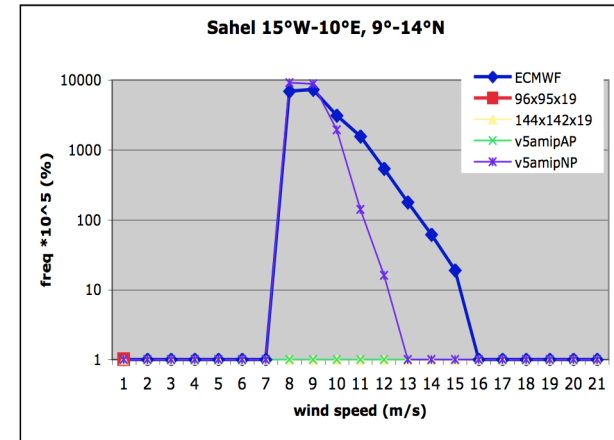
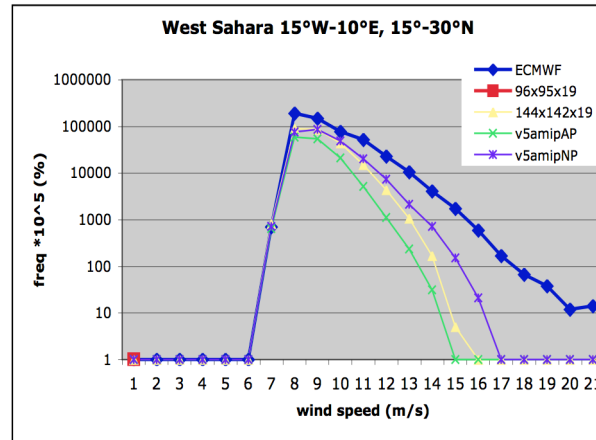
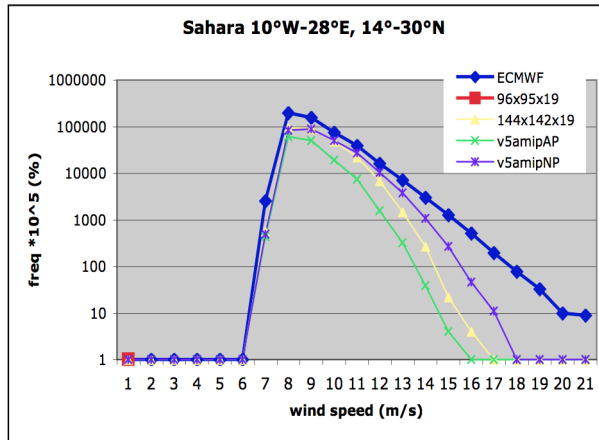
**LMDZ5 144 x 142 x 39**

**LMDZ5 144 x 142 x 39 NP**

## Results (4) : Distribution of « dust-efficient » 10m-wind speed (6h data) LMDZ 144x142 only vs ECMWF

Conditions for « dust-efficient » wind :

10m-wind > thresholds used by INCA & soil dry enough & vegetation cover < 60%



**ECMWF 320 x 160**

**LMDZ 144 x 142 x 19**

**LMDZ5 144 x 142 x 39**

**LMDZ5 144 x 142 x 39 NP**

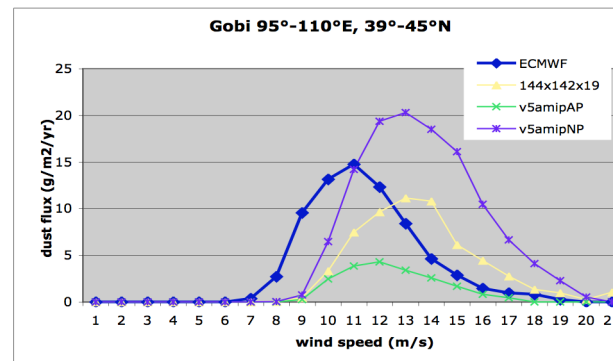
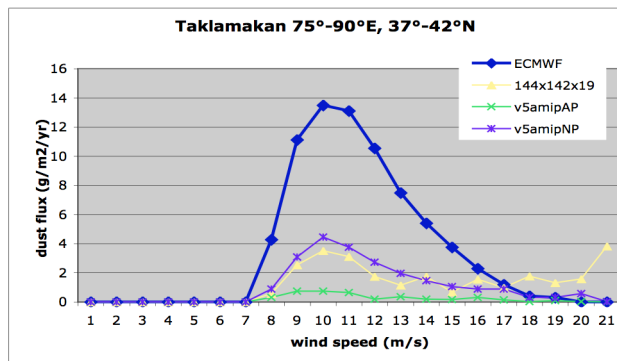
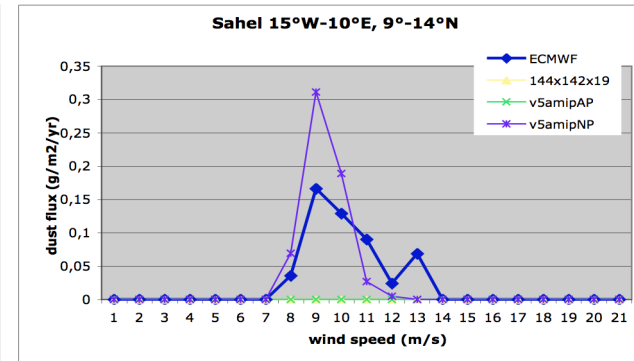
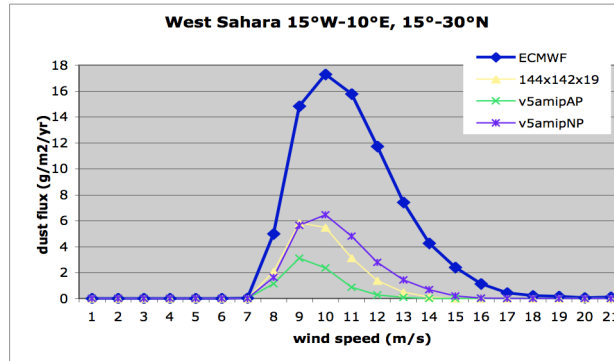
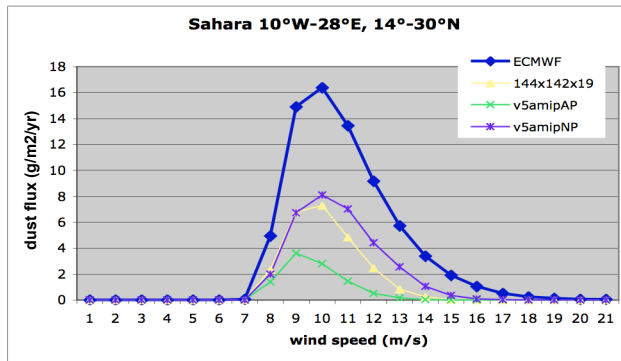
## Results (5) : Dust flux distribution by 10m-wind speed class (6h data) LMDZ 144x142 only vs ECMWF

$$\text{Dust flux} = e_{\text{pot}} * f_{\text{dry}} * f_{\text{veg}} * w_{10\text{m}}^2 (w_{10\text{m}} - w_{\text{th}})$$

$e_{\text{pot}}$ ,  $w_{\text{th}}$  = fct. of surface mineralogy, roughness...

$f_{\text{dry}}$  = between 0 (wet soil or snow cover) and 1 (dry soil)

$f_{\text{veg}}$  = between 0 (vegetation cover >60%) and 1 (bare soil)



ECMWF 320 x 160

LMDZ 144 x 142 x 19

LMDZ5 144 x 142 x 39

LMDZ5 144 x 142 x 39 NP

## A faire :

Sur 144 x 142 x 39 NP :

(espérer plus de réglage du modèle ? :) )

Régler les sources pour vents LMDZ :

- vents seuil, potentiel d'érosion
- par région, en fonction des biais du modèle

Question : caractéristiques des sources en période glaciaire

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