



African Monsoon Multidisciplinary Analyses



2-6 July 2012
Toulouse, France

4th AMMA International Conference

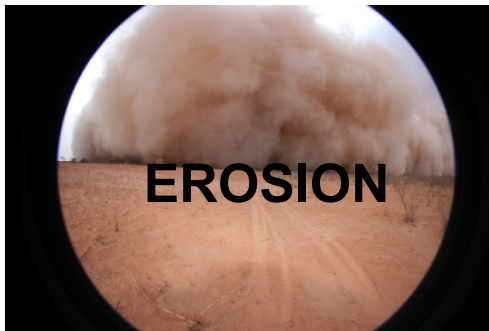
Wind erosion annual cycle in the cultivated Sahel



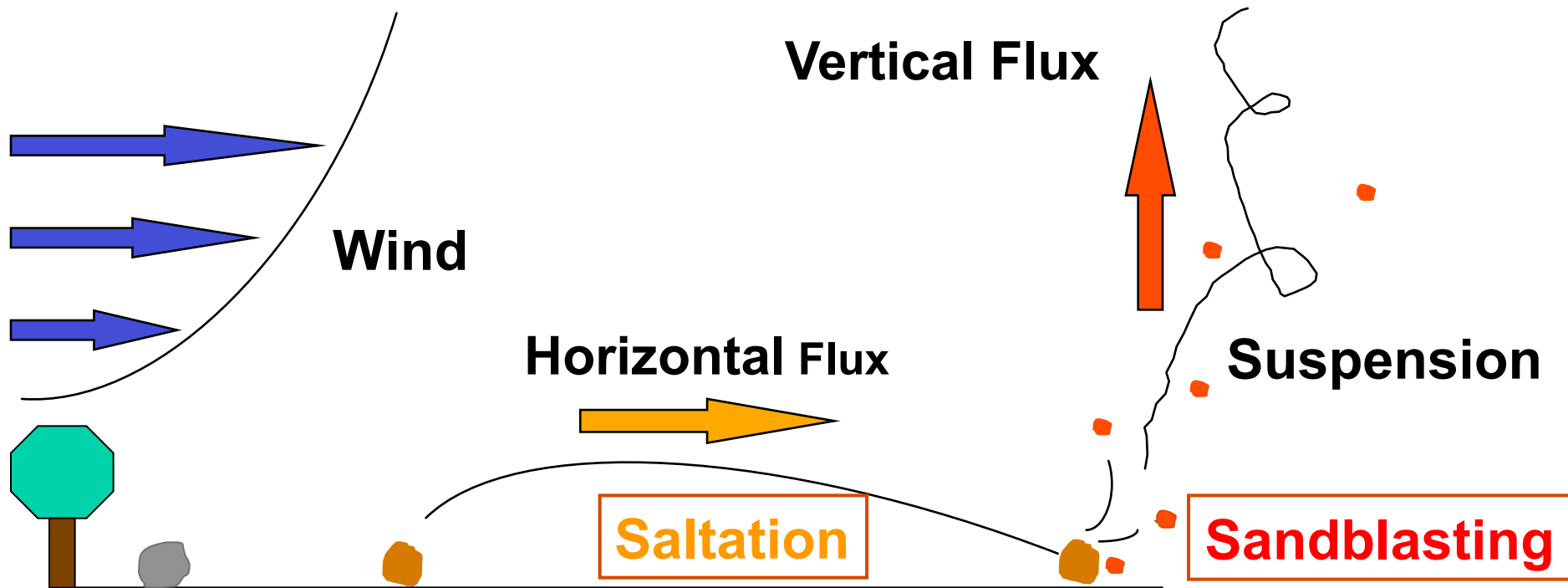
26 juin 2012 Niamey Laurent LABBE

Jean Louis RAJOT, Amadou ABDOURHAMANE TOURE,
Béatrice MARTICORENA, Christel BOUET

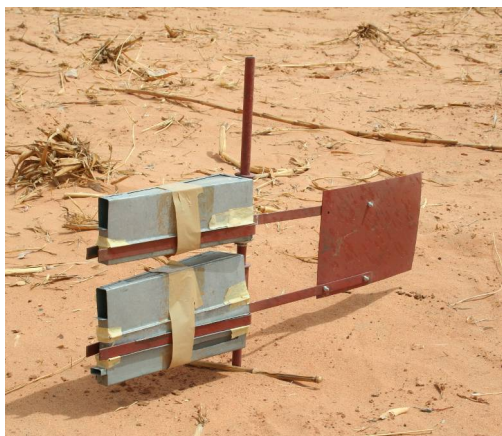
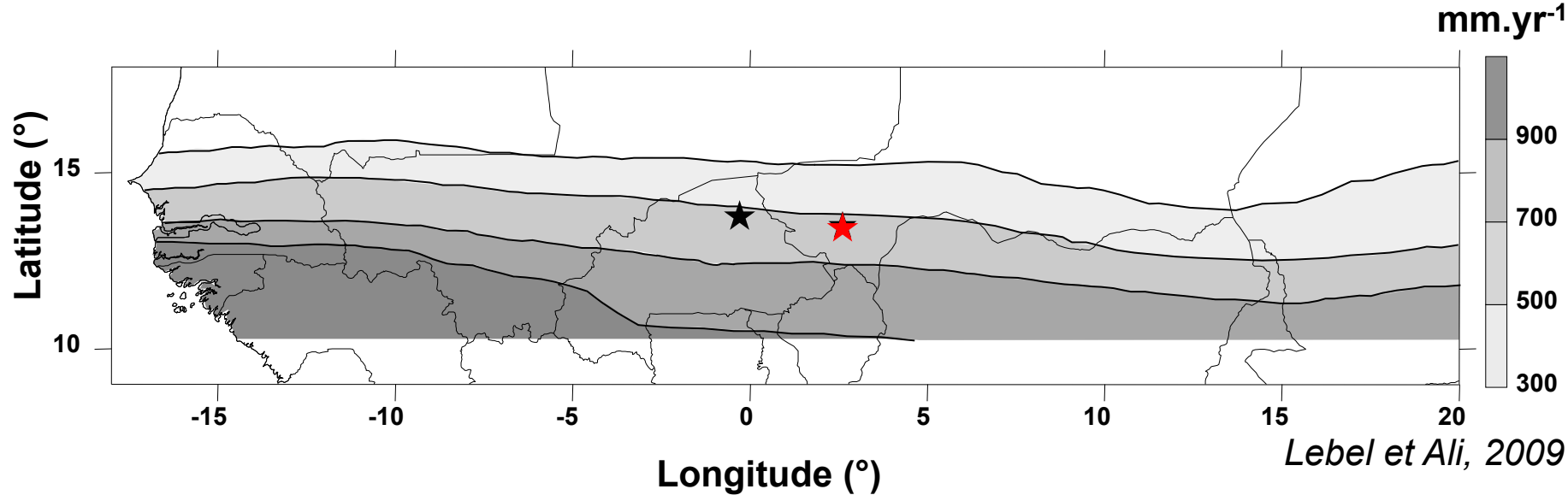




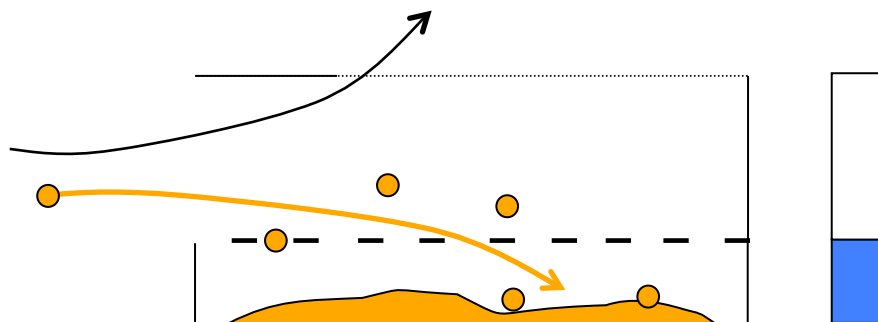
= f (Wind velocity and surface features)



Wind erosion Threshold

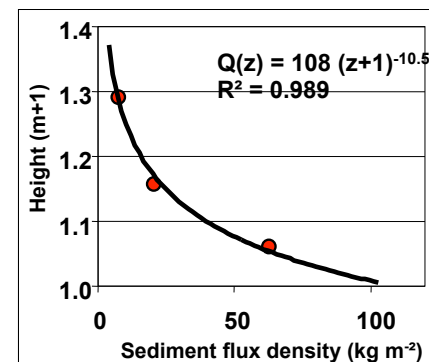


BSNE Sand catcher (*Fryrear 1986*)



$$Q(z) = a(z+1)^b$$

$$Fh = \int_0^{0.4} Q(z) = \frac{a}{b+1} (0.4+1)^{(b+1)} - 1$$



Culture vivrière = Mil (+Niébé) - Très peu d'intrants... / Elevage +/- transhumant (Peul)

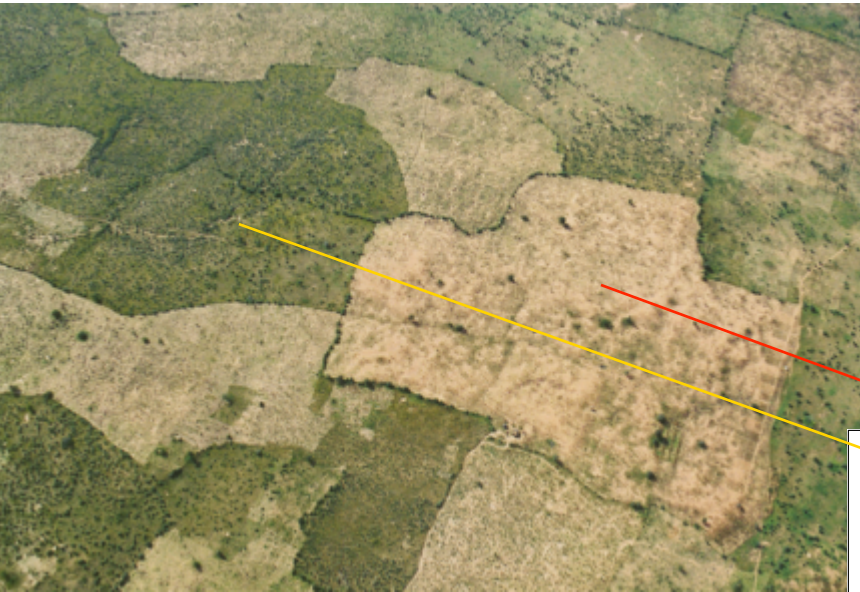
Juin 2007



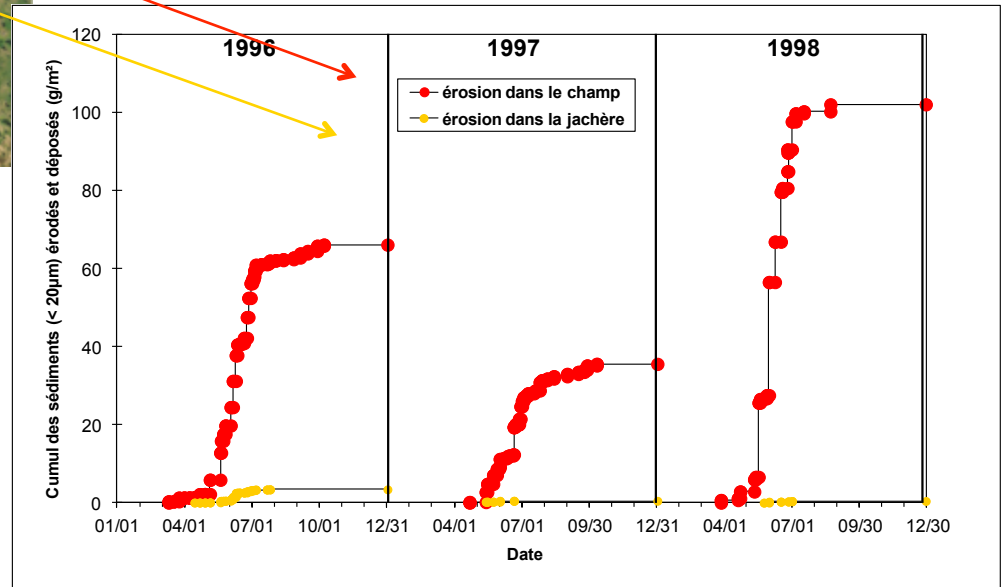
Septembre 2007



Variabilité spatiale



**In Niger (preci. <500 mm/yr),
wind erosion occurs only on
cultivated fields at the
beginning of the rainy season !!**



Rajot, 2001

Pastoral area : Katchari - Burkina Faso – 2001 2012

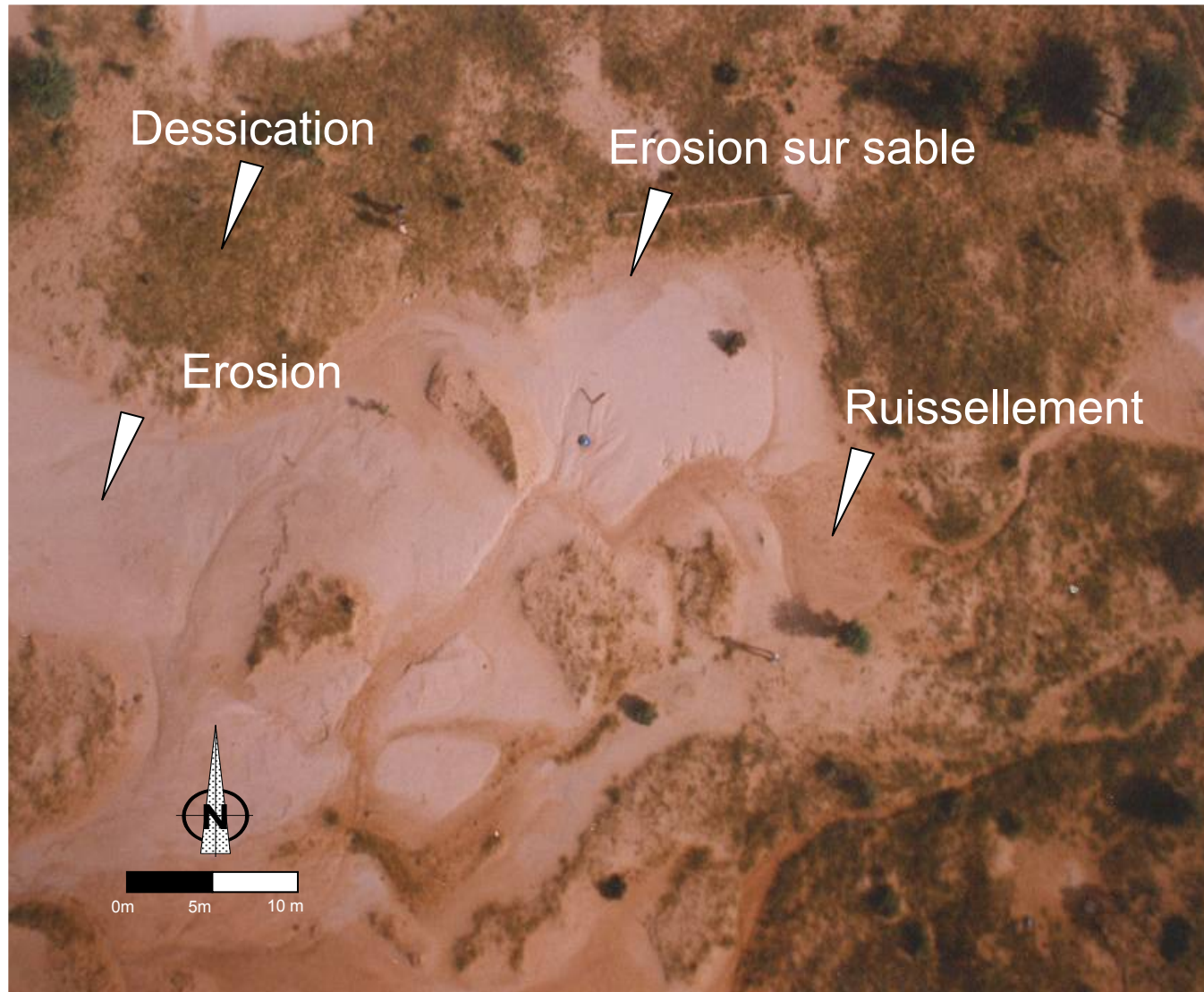
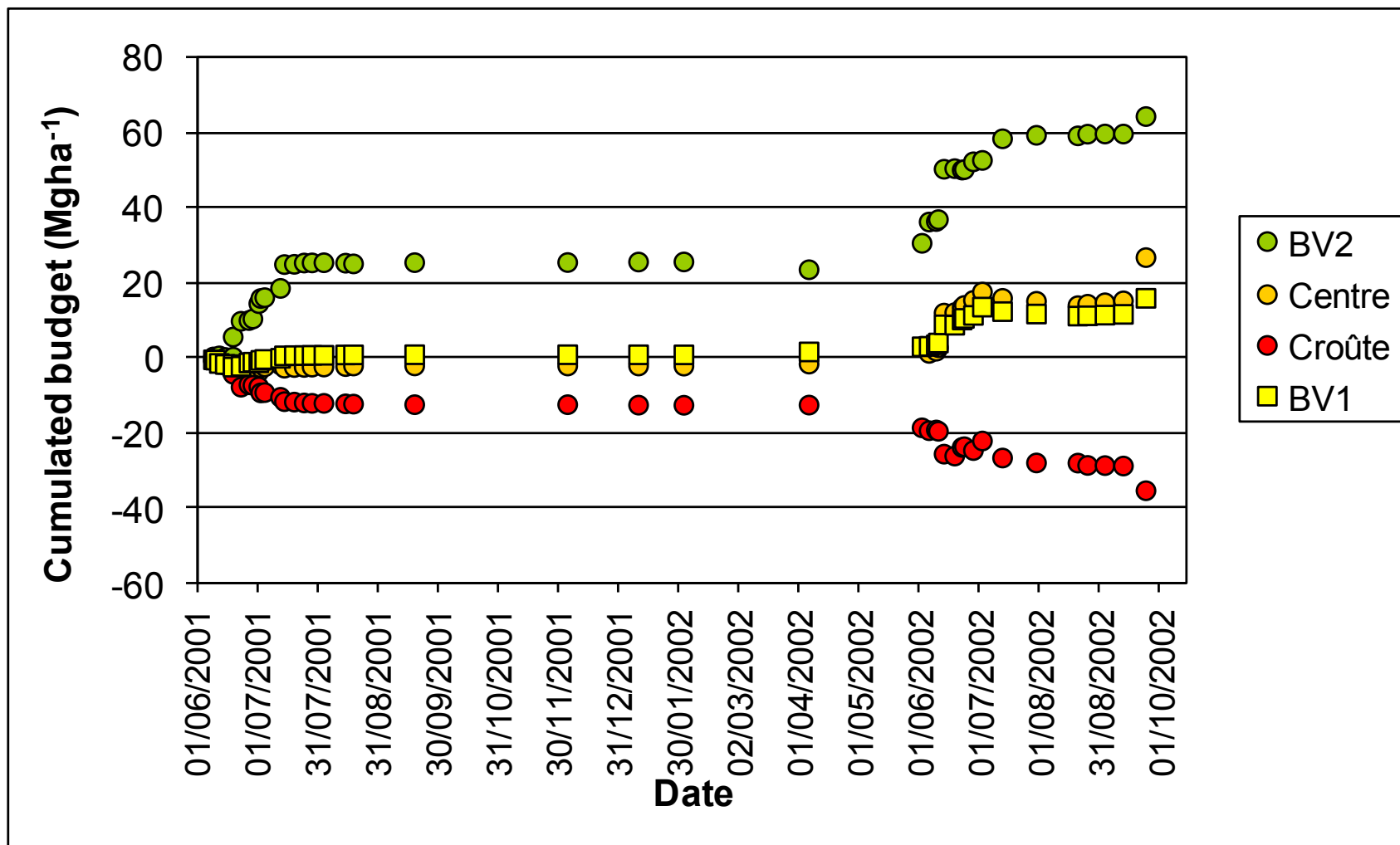




Photo IRD, Olivier RIBOLZI

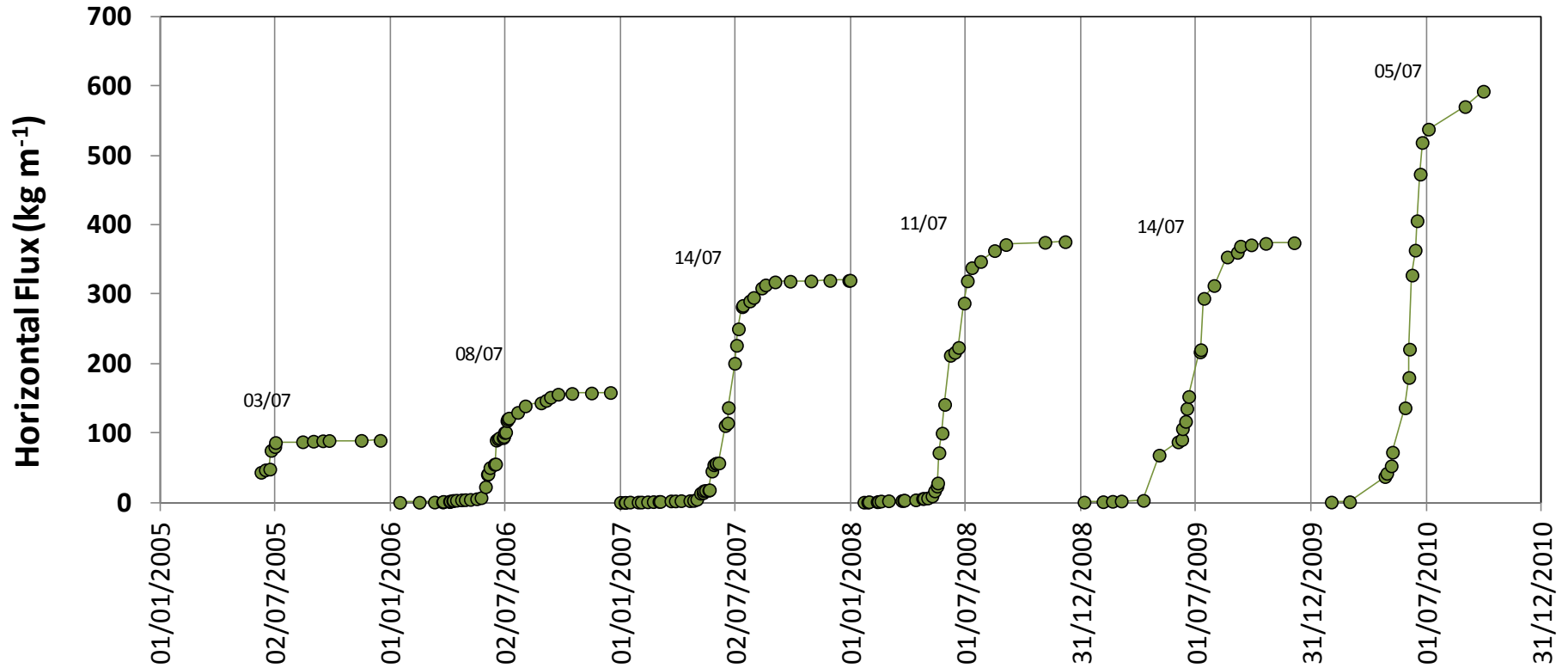
Niamey 27 juin 2012

Katchari - Burkina Faso – 2001 2012

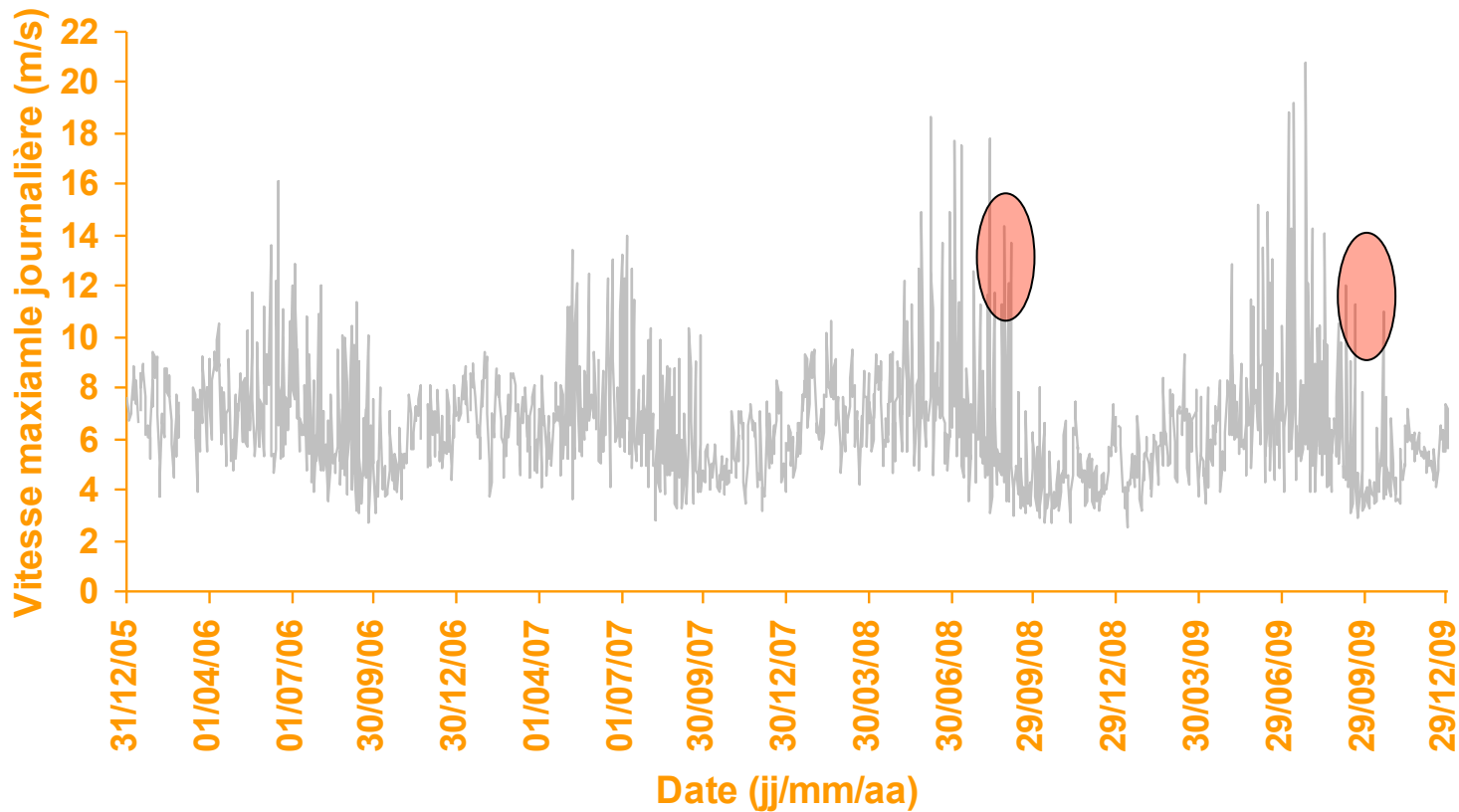
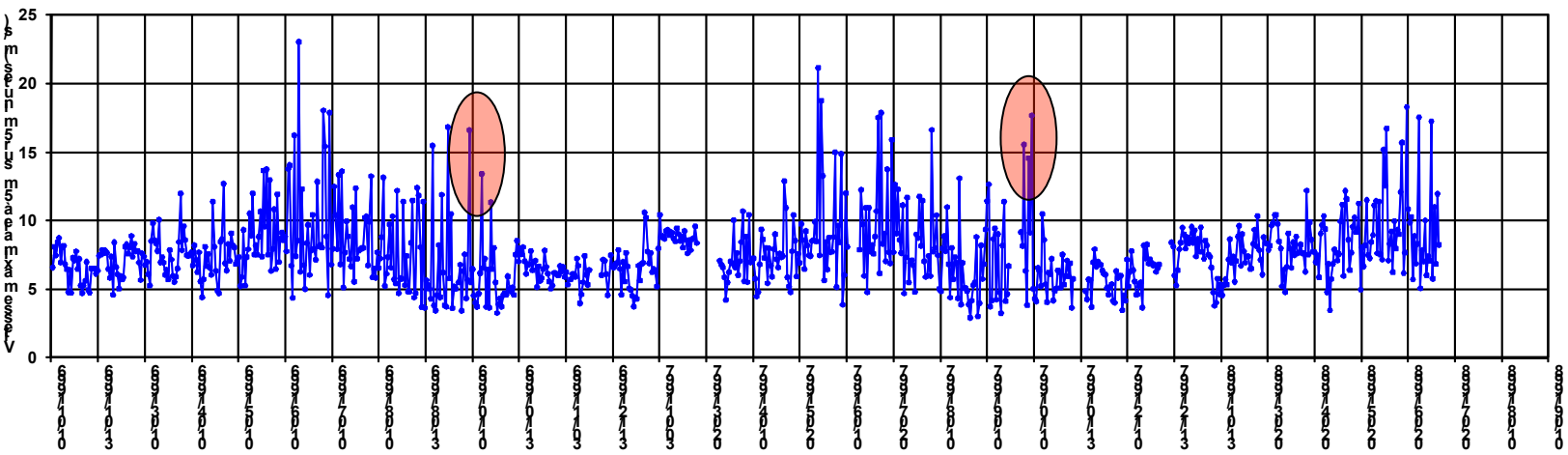


Rajot et al. 2009

AMMA flux Measurements



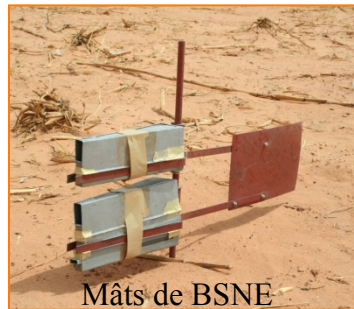
Abdourhamane Touré et al. 2009



Experimental set up – Banizoumbou : measurement plots



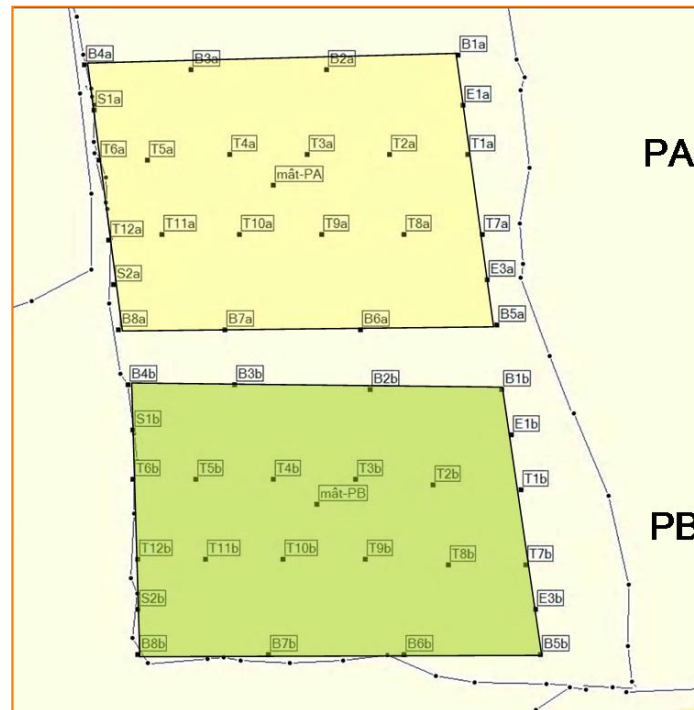
Z_0



F_h

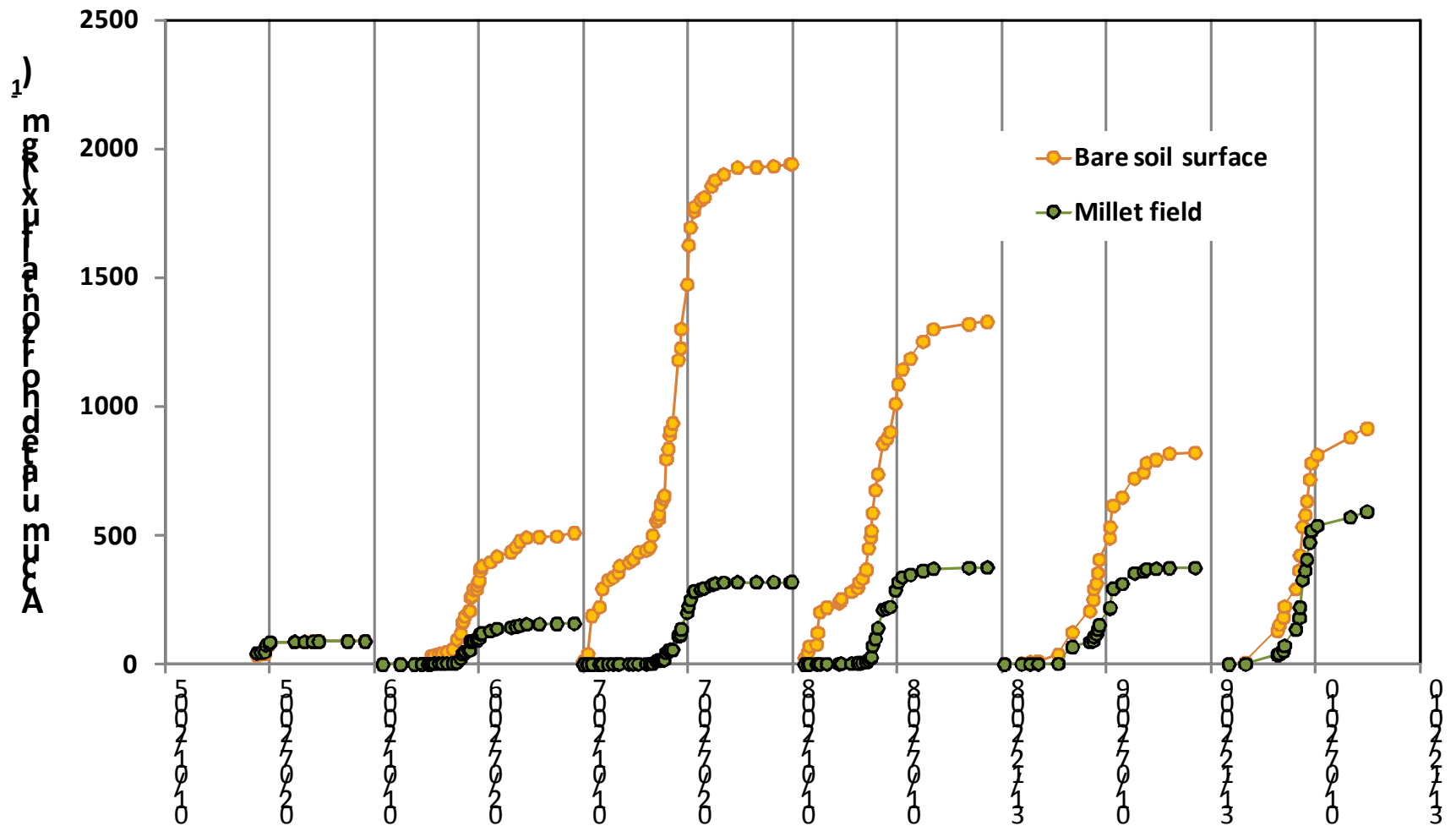


U_t

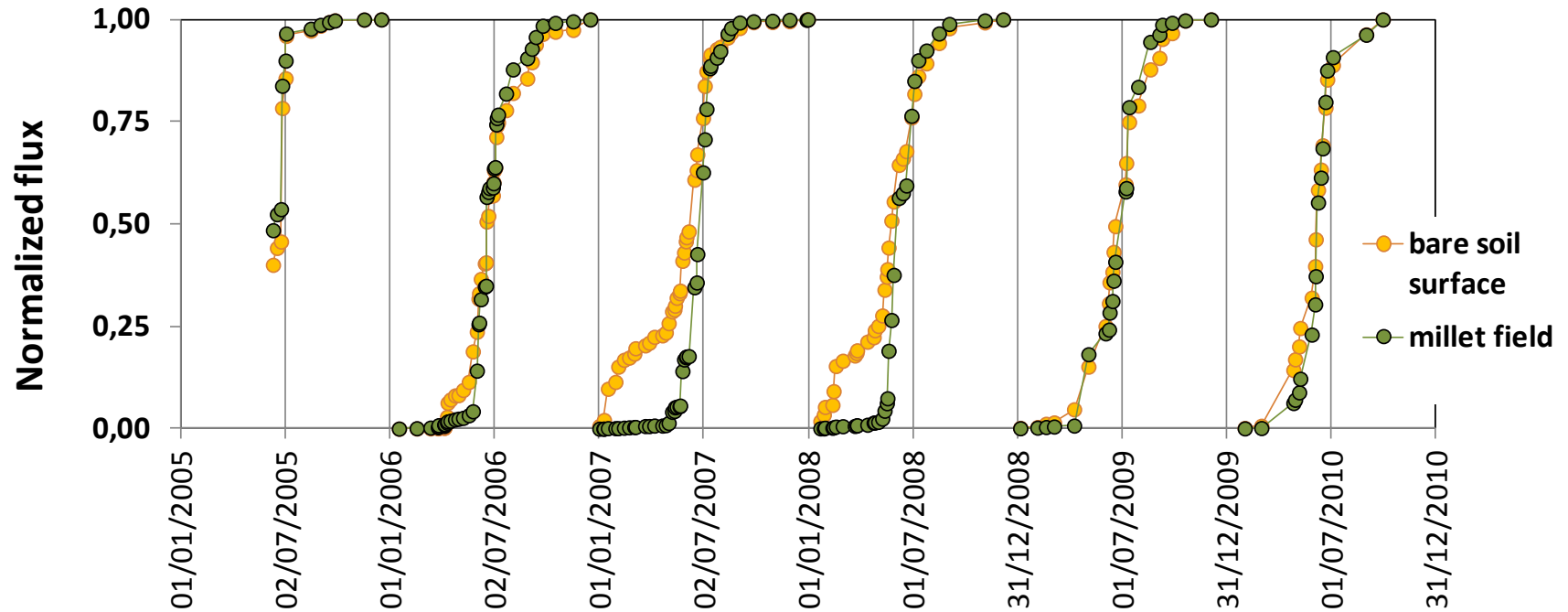


Abdourhamane Touré et al. 2009

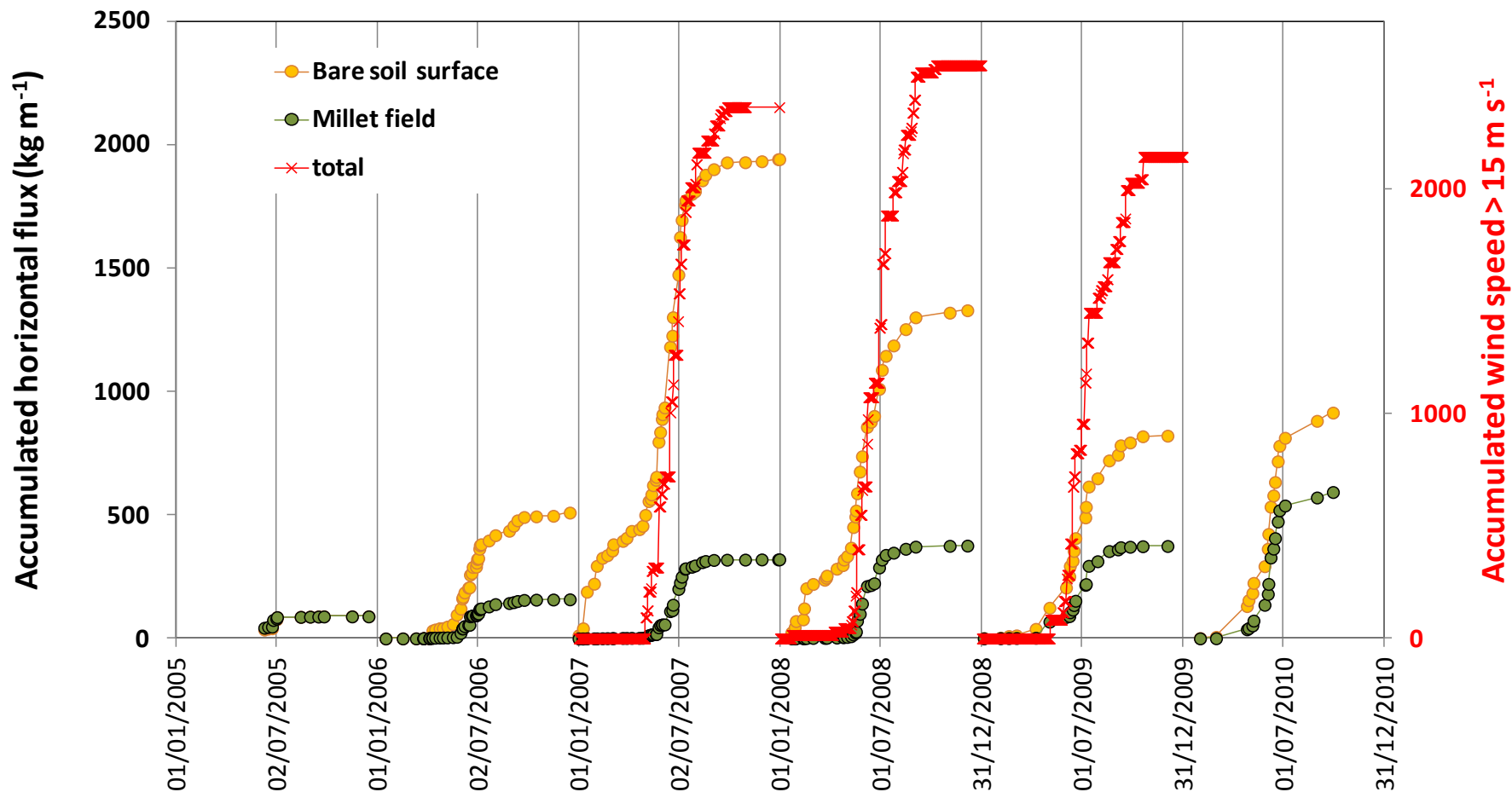
AMMA flux Measurements



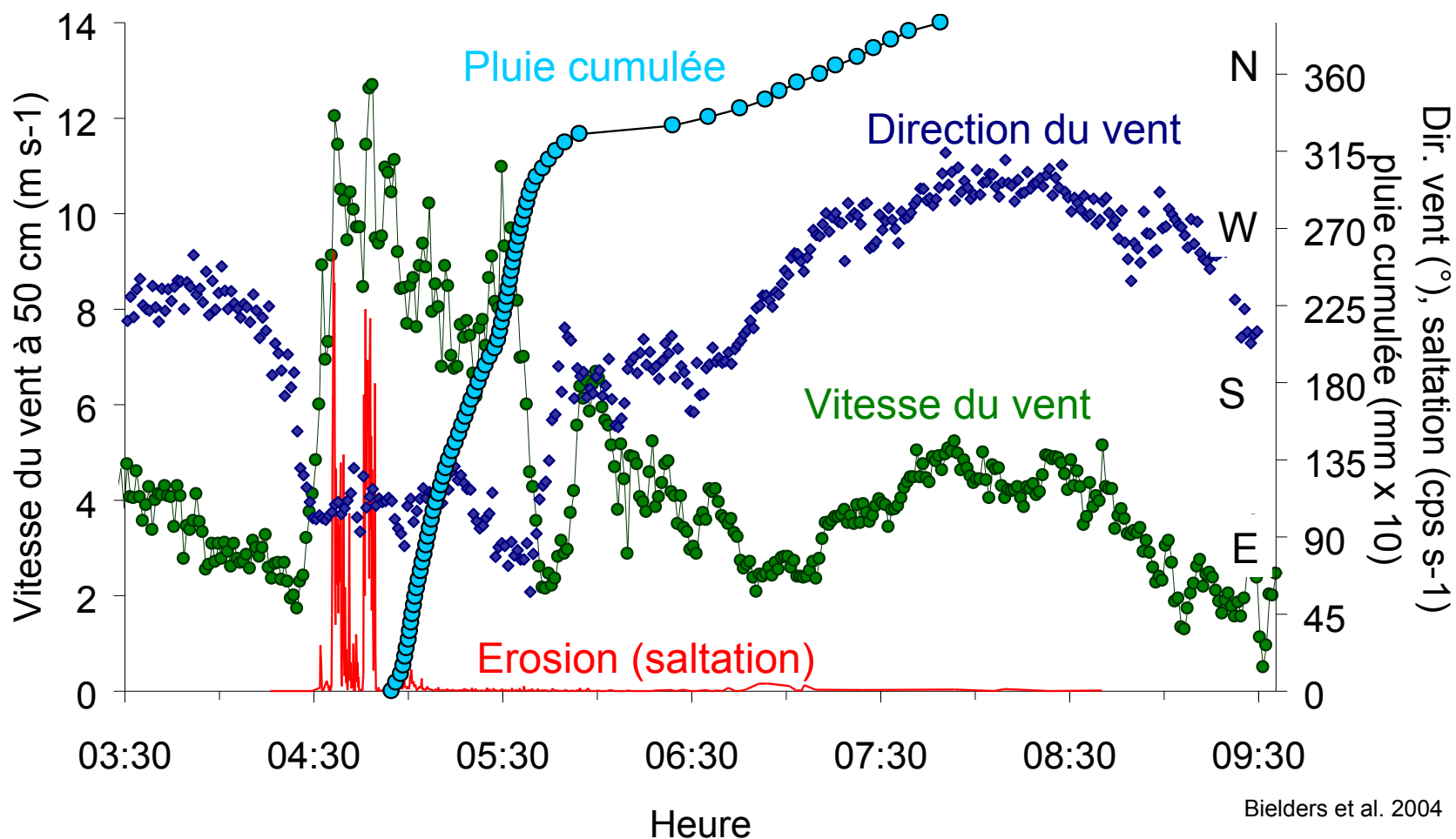
AMMA flux Measurements



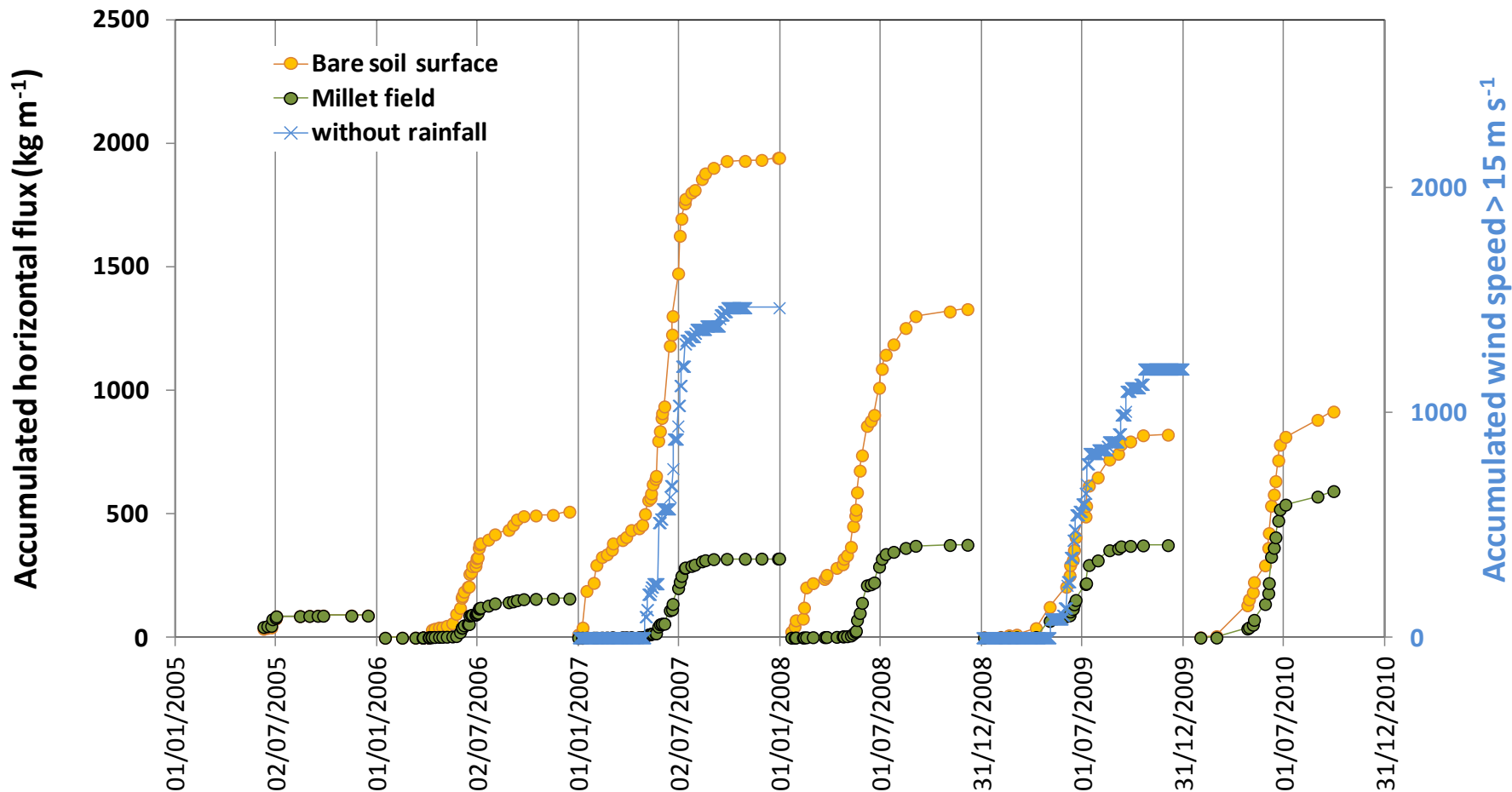
Influence of strong winds ($> 15 \text{ m s}^{-1}$)



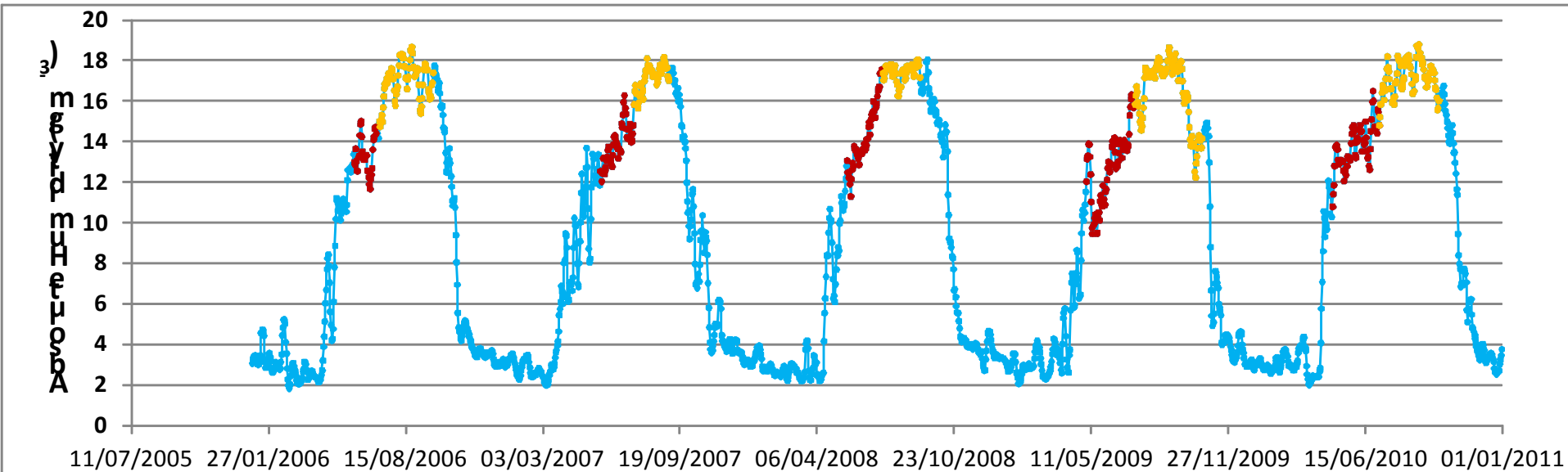
Typical MCS



Influence of strong winds ($> 15 \text{ m s}^{-1}$)



Meteorological control



Conclusions

- There is a typical annual cycle of wind erosion in the Sahel
- Wind erosion is mainly due to convective events occurring at the beginning of the rainy season
- It dramatically decreases by the beginning of July because duration of high wind velocities before convective rainfall decreases = meteorological control
- Vegetation in the millet field does not play an important role to decrease wind erosion in the growing phase
- At the end of the rain season, developed vegetation, because it is sparse, allows low erosion fluxes
- But vegetation controls wind erosion, mainly as litter, during the dry season and at the beginning of the next rainy season



Thank you for your attention



Formation des croûtes d'érosion sur terrain plat et non pentu :
pas d'érosion hydrique



Données iconographiques depuis 1950 / mesure des processus

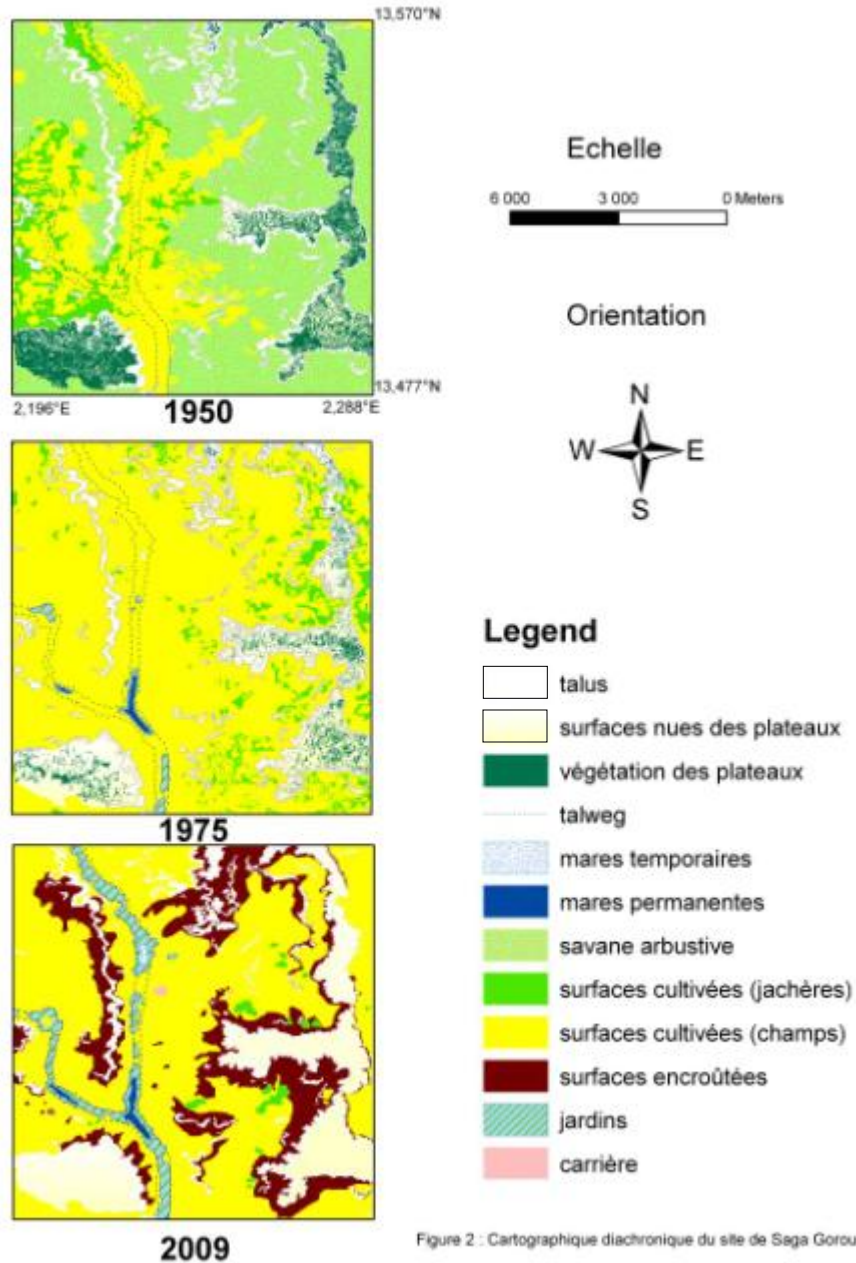
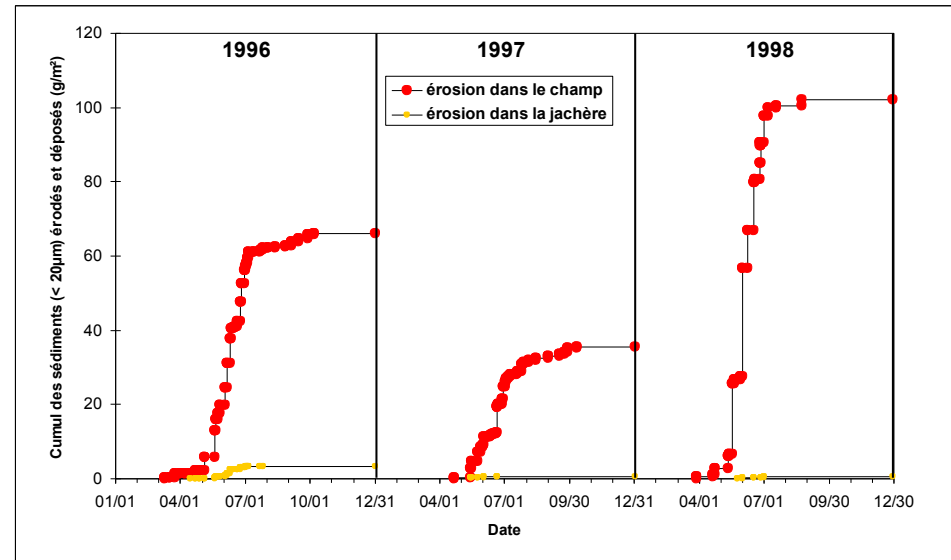
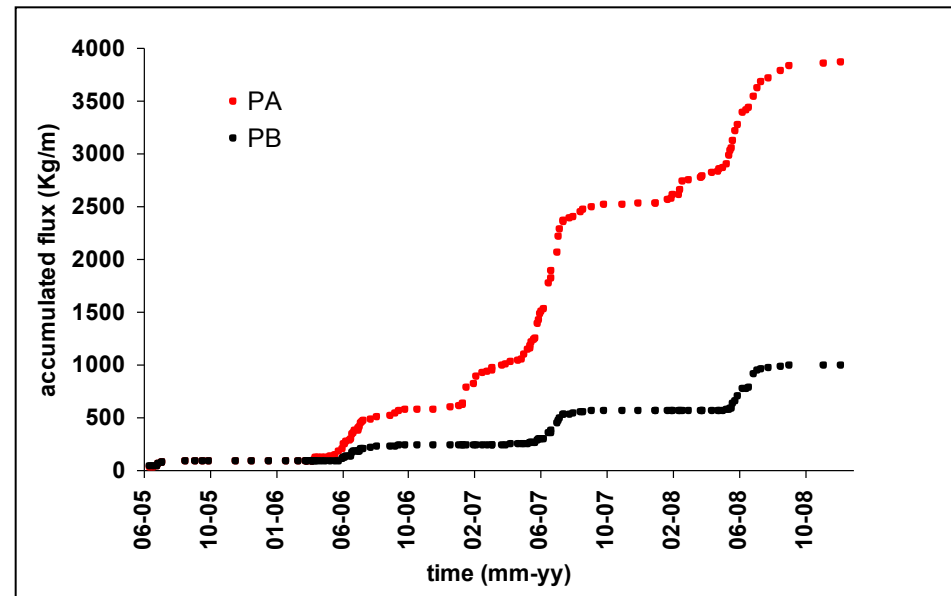


Figure 2 : Cartographie diachronique du site de Saga Gorou



Rôle des Jachères



Rôle des résidus de culture

Fourrage



Matériaux de construction

