



Campagne de mesure disdrométrique d'HMCO-ENPC au SIRT

Auguste Gires, Ioulia Tchiguirinskaia, D Schertzer

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Auguste Gires, Ioulia Tchiguirinskaia, D Schertzer. Campagne de mesure disdrométrique d'HMCO-ENPC au SIRT. Journée Scientifique SIRT 2017, Jun 2017, Palaiseau, France. 2017. hal-01706669

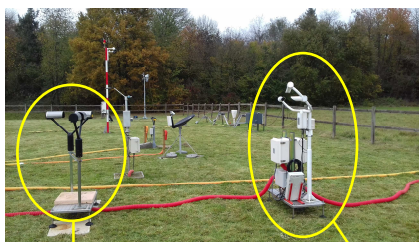
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Submitted on 12 Feb 2018

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Trois disdromètres optiques
sur le site du SIRTa

2 Parsivel² (OTT)
Mesure de la lumière occultée
par les gouttes

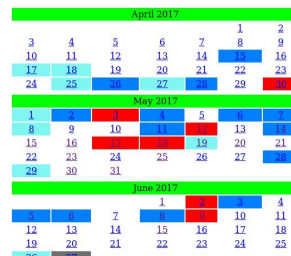
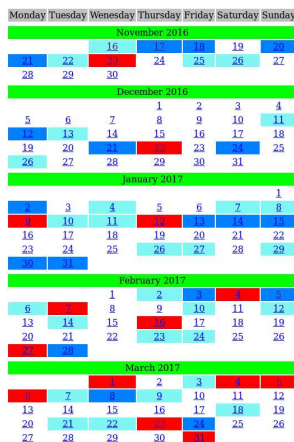
**1 PWS100
(Campbell Scientific)**
Mesure de la lumière
réfractée par les gouttes

→ Accès au nombre de goutte par classes de
vitesse et de taille chaque 30s

Des mesures depuis novembre 2016

HMCO disdrometers at SIRTa

Quicklooks

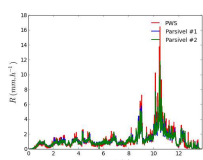


Color code

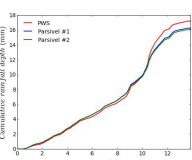
No rain
<1 mm
<5 mm
>5 mm
No data

Quelques événements marquants parmi les 78 observés

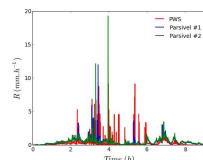
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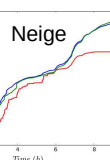
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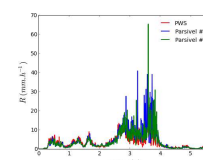
2017-01-15 12:13:00



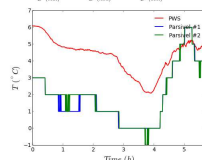
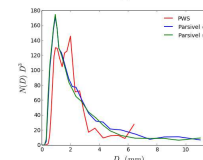
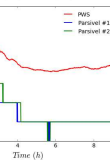
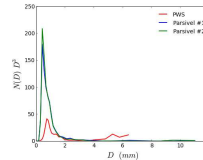
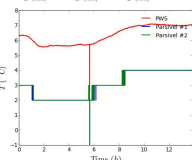
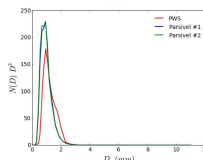
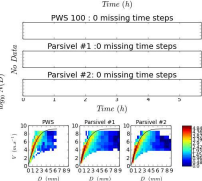
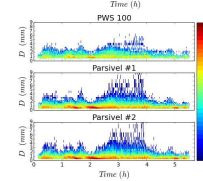
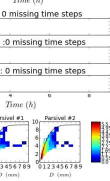
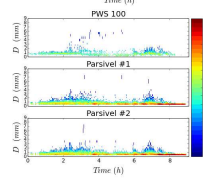
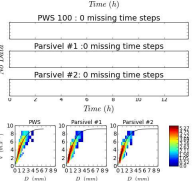
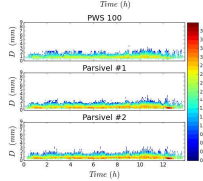
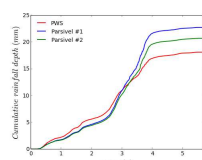
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2017-03-06 07:42:30



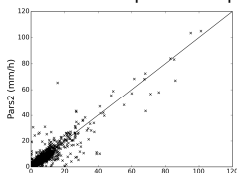
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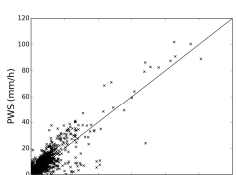
Scores classiques

Cumul sur les 78 événements (mm):
Pars1 : 250 / Pars2 : 244 / PWS : 274

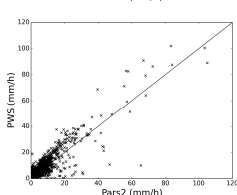
Pour les pas de temps où $R > 0.2$ mm/h



NB = -0.029
correlation = 0.93
Nash = 0.86
RMSE = 1.43
Slope = 0.91
Intercept = 0.086



NB = 0.10
correlation = 0.91
Nash = 0.76
RMSE = 2.52
Slope = 1.043
Intercept = 0.094

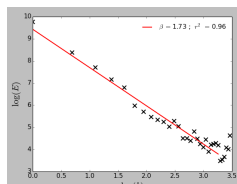


NB = 0.13
correlation = 0.92
Nash = 0.77
RMSE = 2.37
Slope = 1.07
Intercept = 0.11

Premières comparaisons

Comparaison multifractale

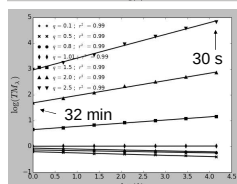
En moyenne d'ensemble sur tous les événements,
échantillon de 64 pas de temps (=32 min)



Analyse spectrale

$$E(k) \propto k^{-\beta}$$

Pente spectrale



Analyse TM

Fonction des
moments
d'échelle

$$\langle \varepsilon_\lambda^q \rangle \approx \lambda^{K(q)}$$

Résolution

$$K(q) = \frac{C_1}{\alpha - 1} (q^\alpha - q)$$

Analyse DTM

$$\langle (R_\lambda^{(n)})^q \rangle \approx \lambda^{K(q, \eta)}$$

$$K(q, \eta) = \eta^f K(q)$$

	Pars1	Pars2	PWS
R^2 (TM $q=1.5$)	0.998	0.998	0.996
β	1.73	1.79	1.95
C_1	0.18	0.18	0.18
α	1.62	1.71	1.56
H	0.52	0.56	0.63

C_1 = intermittence moyenne
 α = indice de multifractalité
 H = exposant de non conservation

References:

- ENPC, 2016. Dépôt de brevet; Procédé et dispositif de mesure du diamètre équivalent d'une goutte d'eau
- Gires, A., Tchiguirinskaia, I., Schertzer, D., 2016. Multifractal comparison of the outputs of two optical disdrometers. Hydrological Sciences Journal, DOI:10.1080/02626667.2015.1055270.
- Schertzer, D., Lovejoy, S., 2011. Multifractals, generalized scale invariance and complexity in geophysics. International Journal of Bifurcation and Chaos 21(12), 3417-3456.