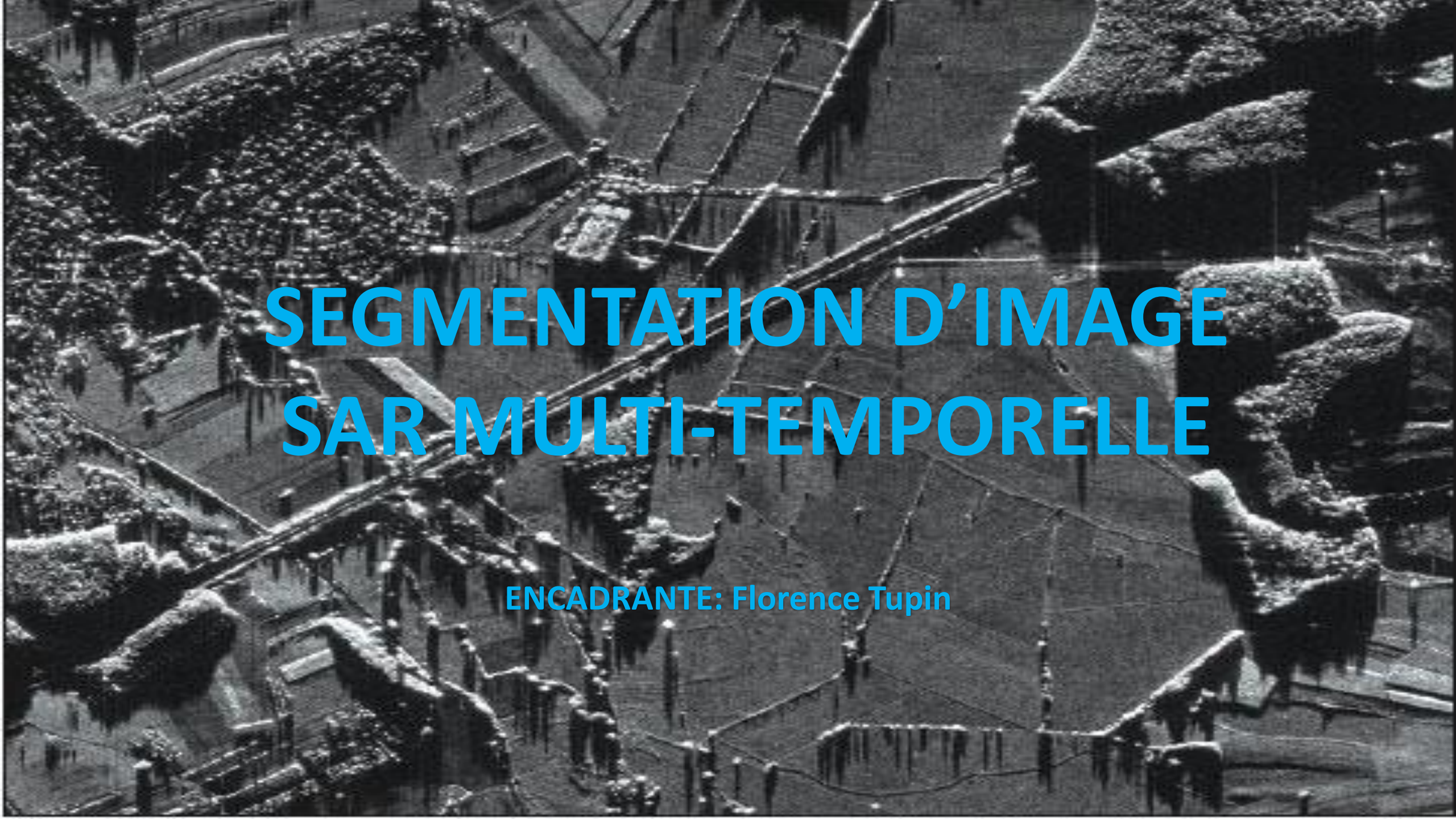
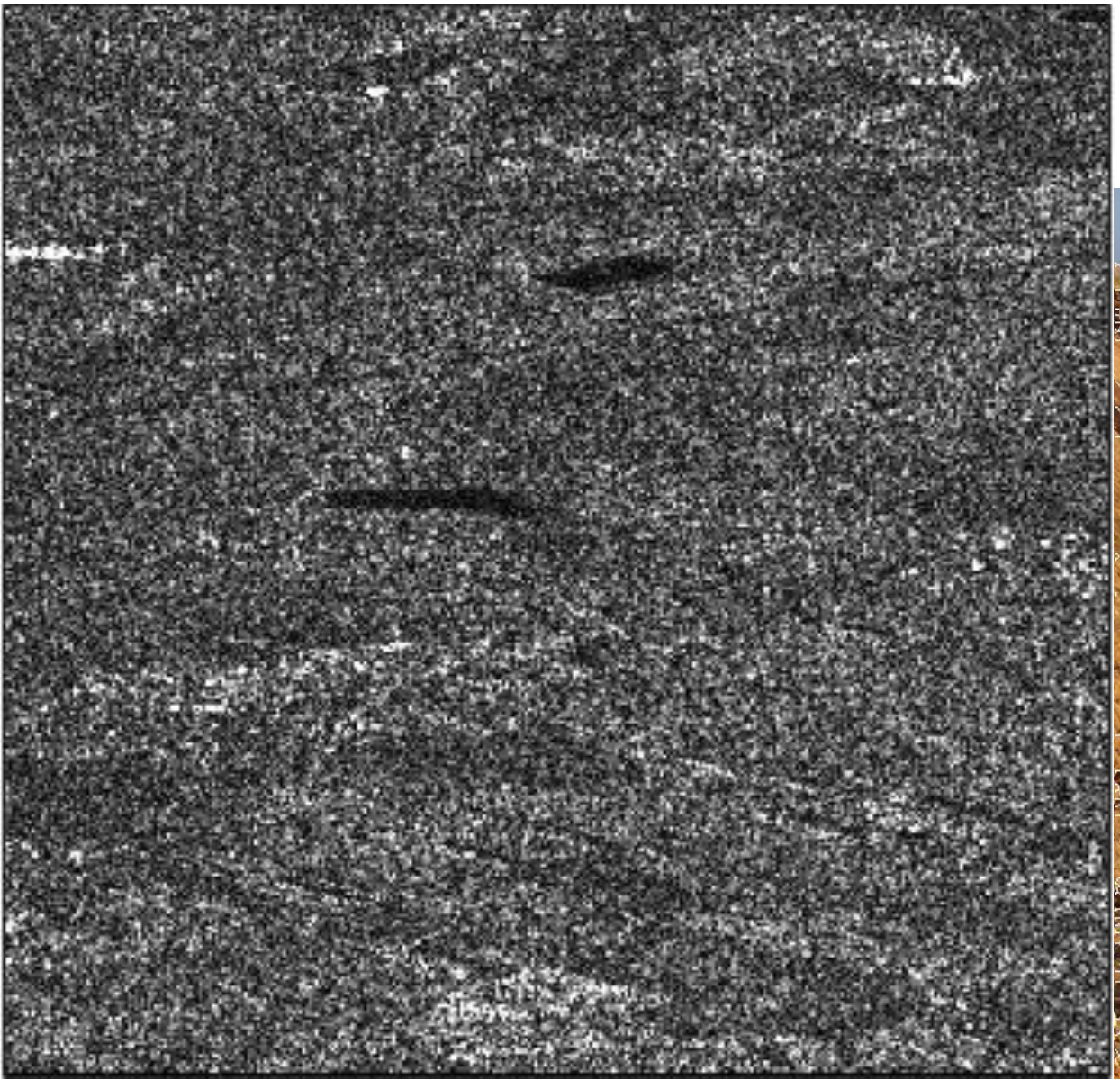


SEGMENTATION D'IMAGE SAR MULTI-TEMPORELLE

ENCADRANTE: Florence Tupin

I. Introduction
II. Contexte
III. K-means
IV. SLIC
V. Résultats expérimentaux
VI. Conclusions

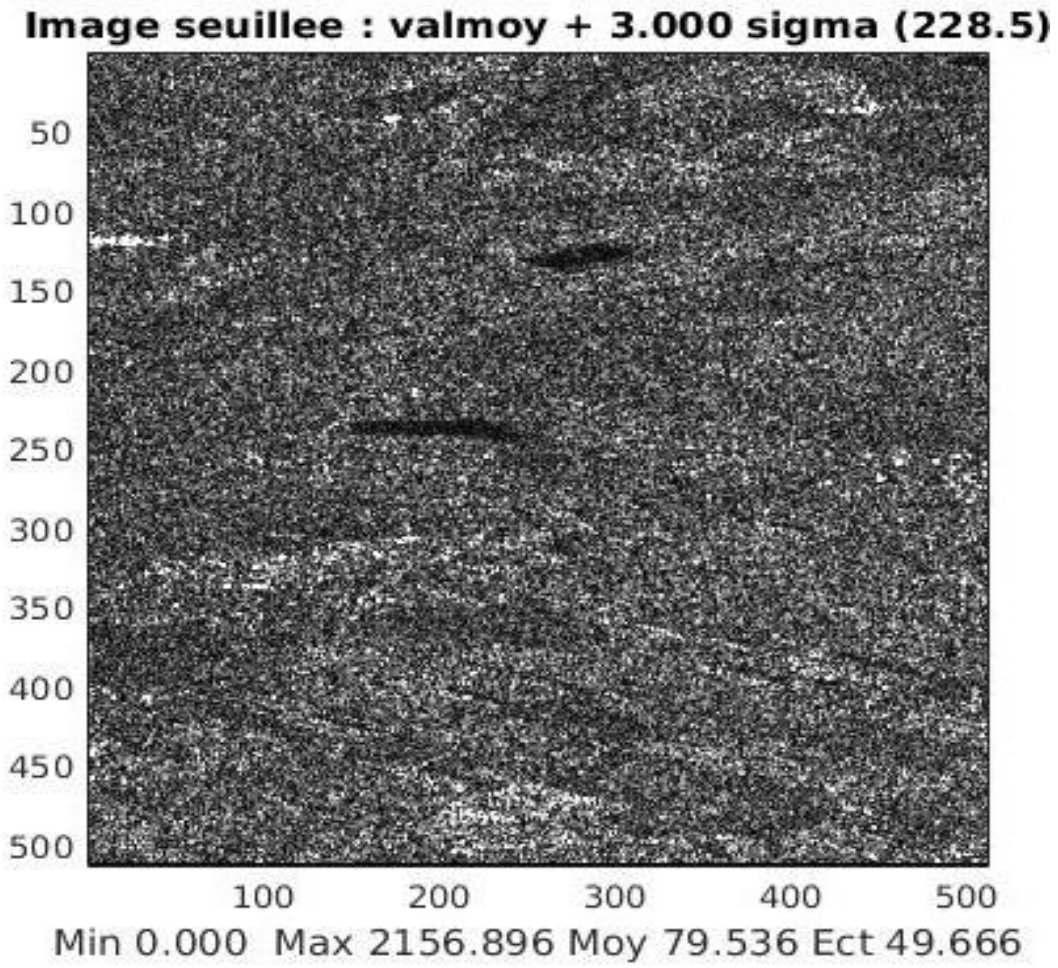
INTRODUCTION

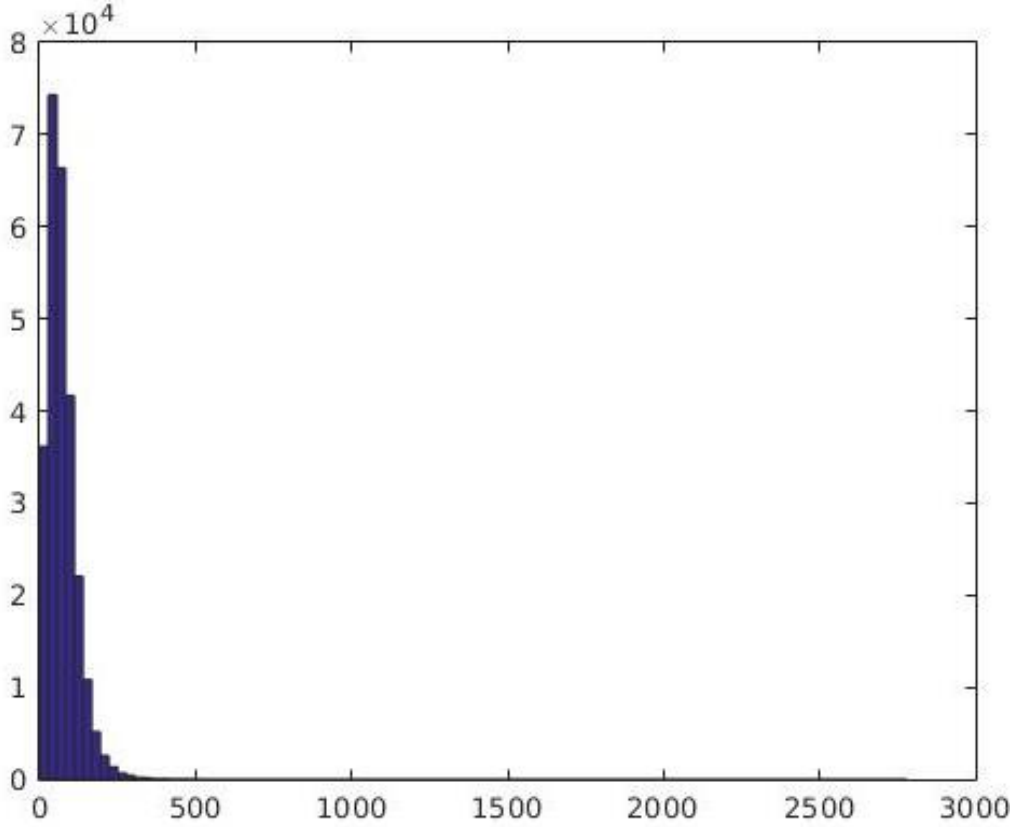


SLIC

CONTEXTE

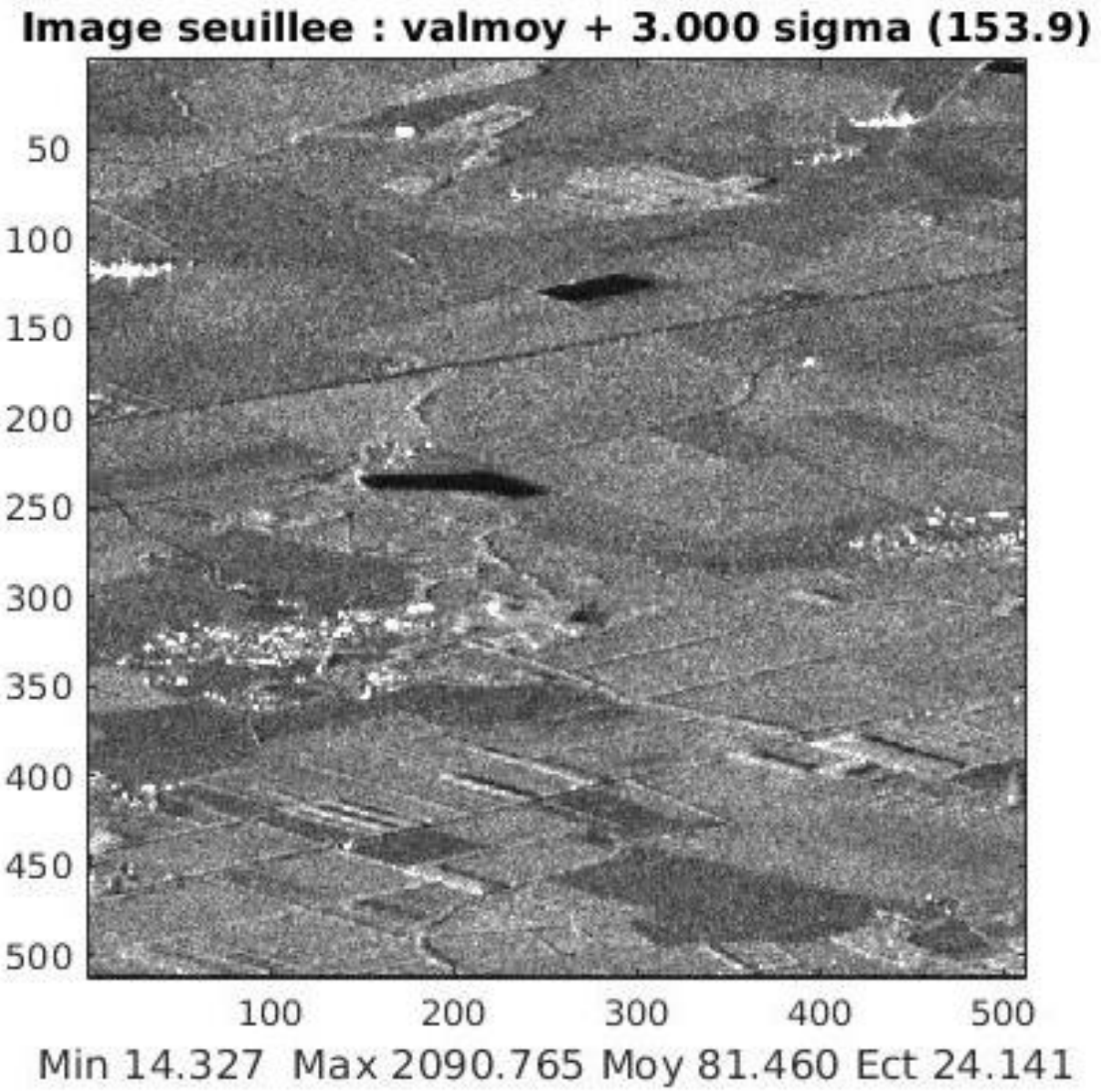
24 images du site de Chenguang



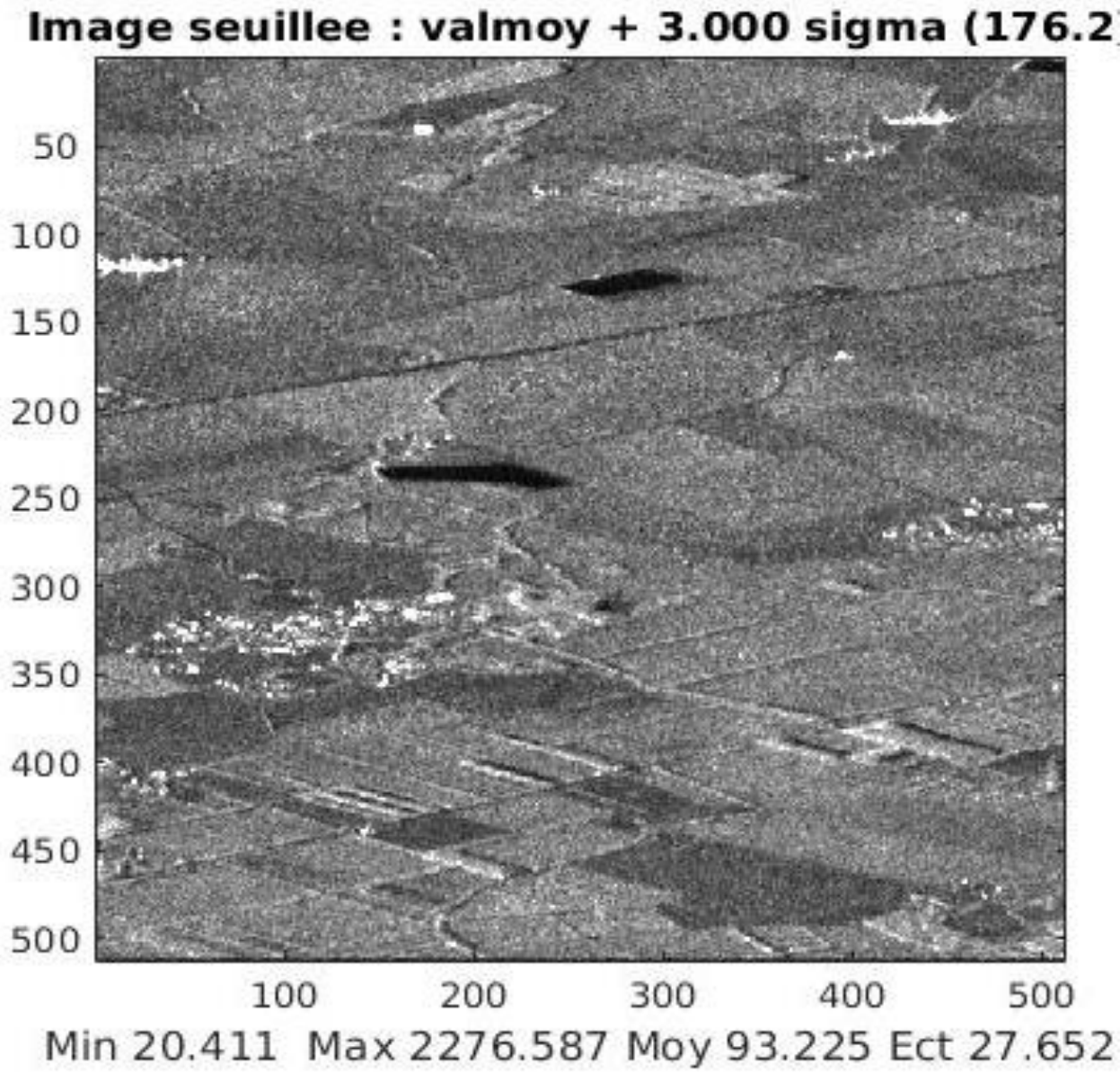


Fonctions de visualisation:

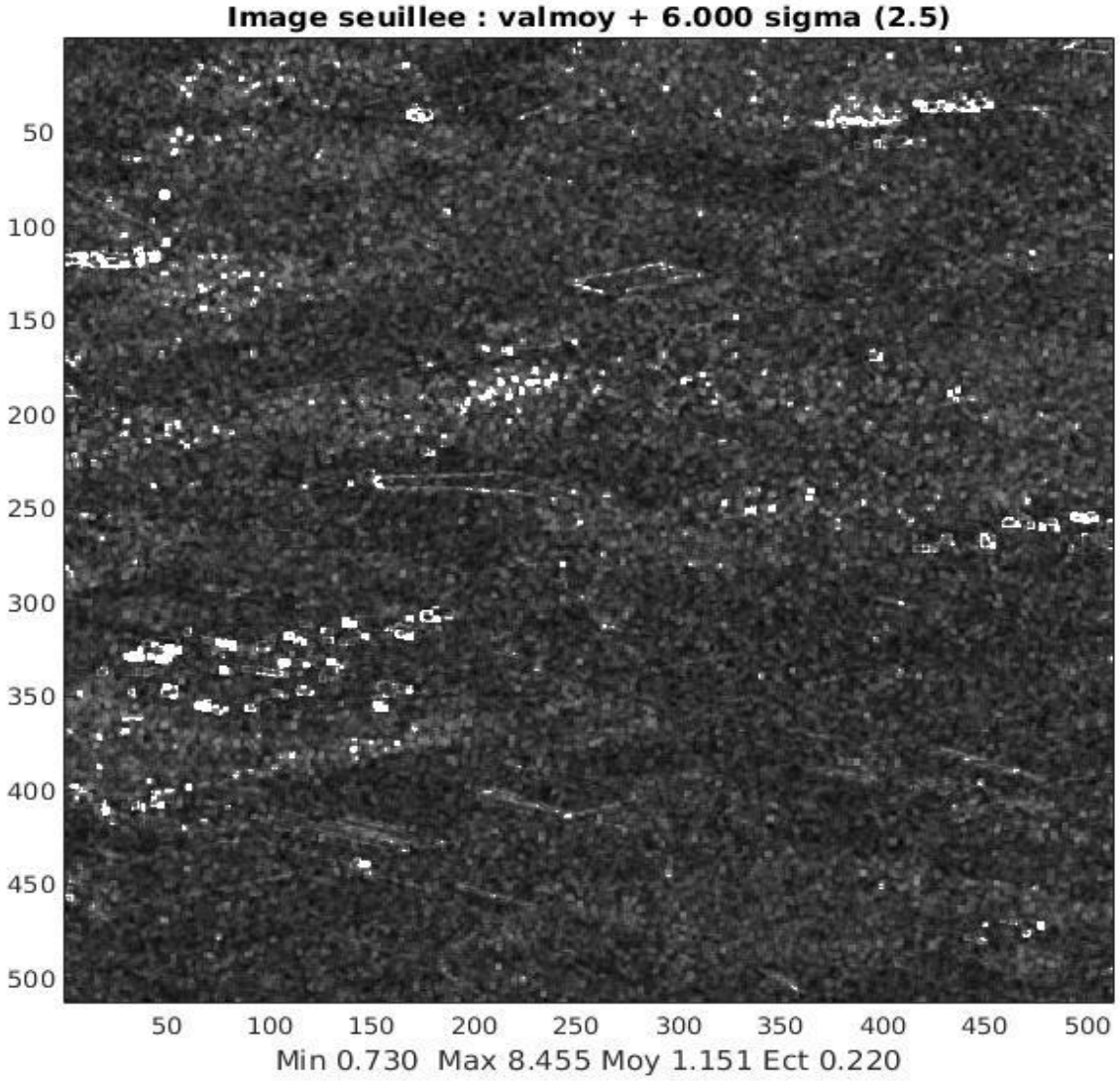
imz2mat.m
visusar.m

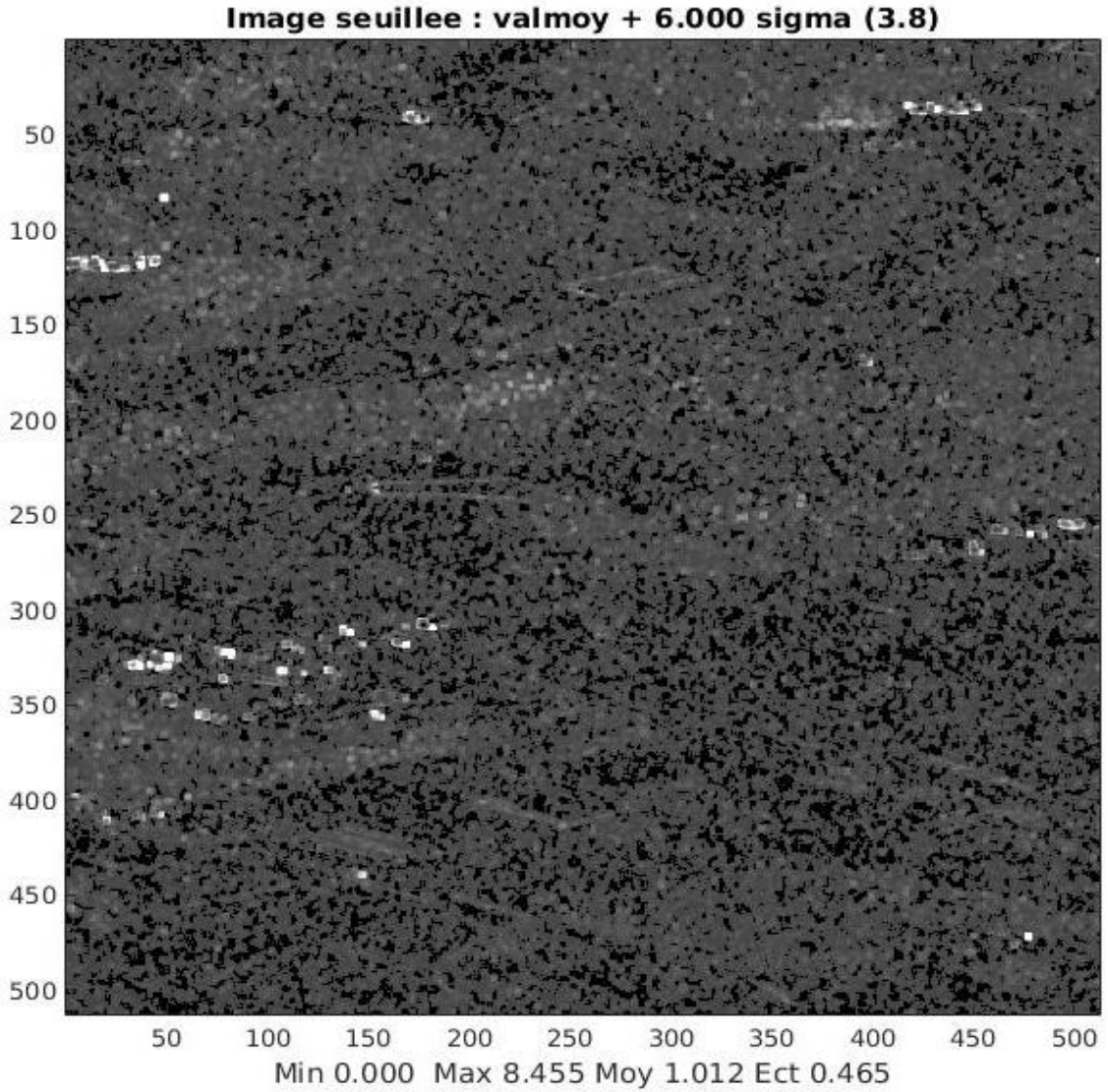


Moyenne temporelle L1



Moyenne temporelle L2

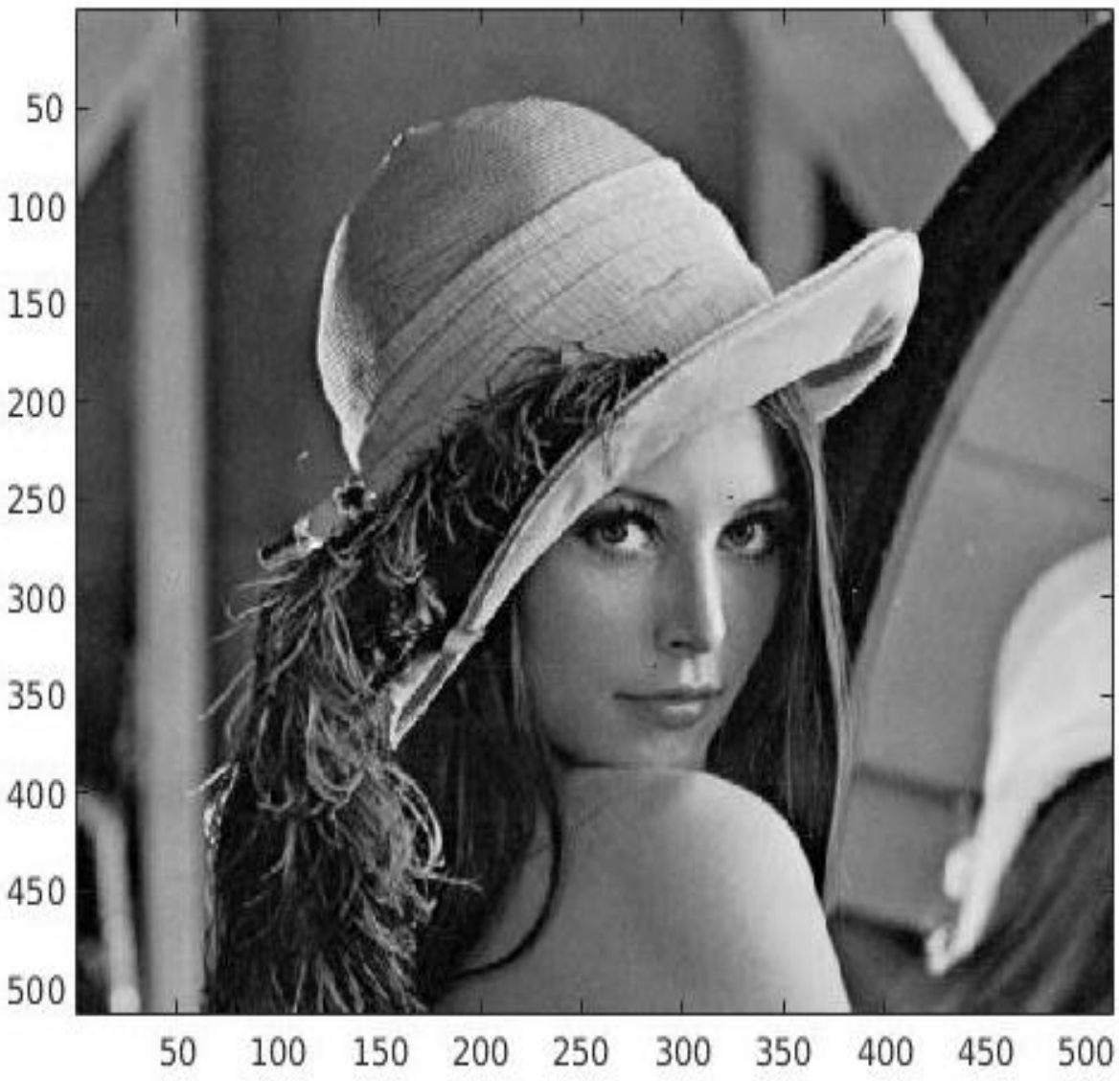




Rapport écart-type sur moyenne de l’intensité des 24 pixels multi-temporels

K-MEANS

K=10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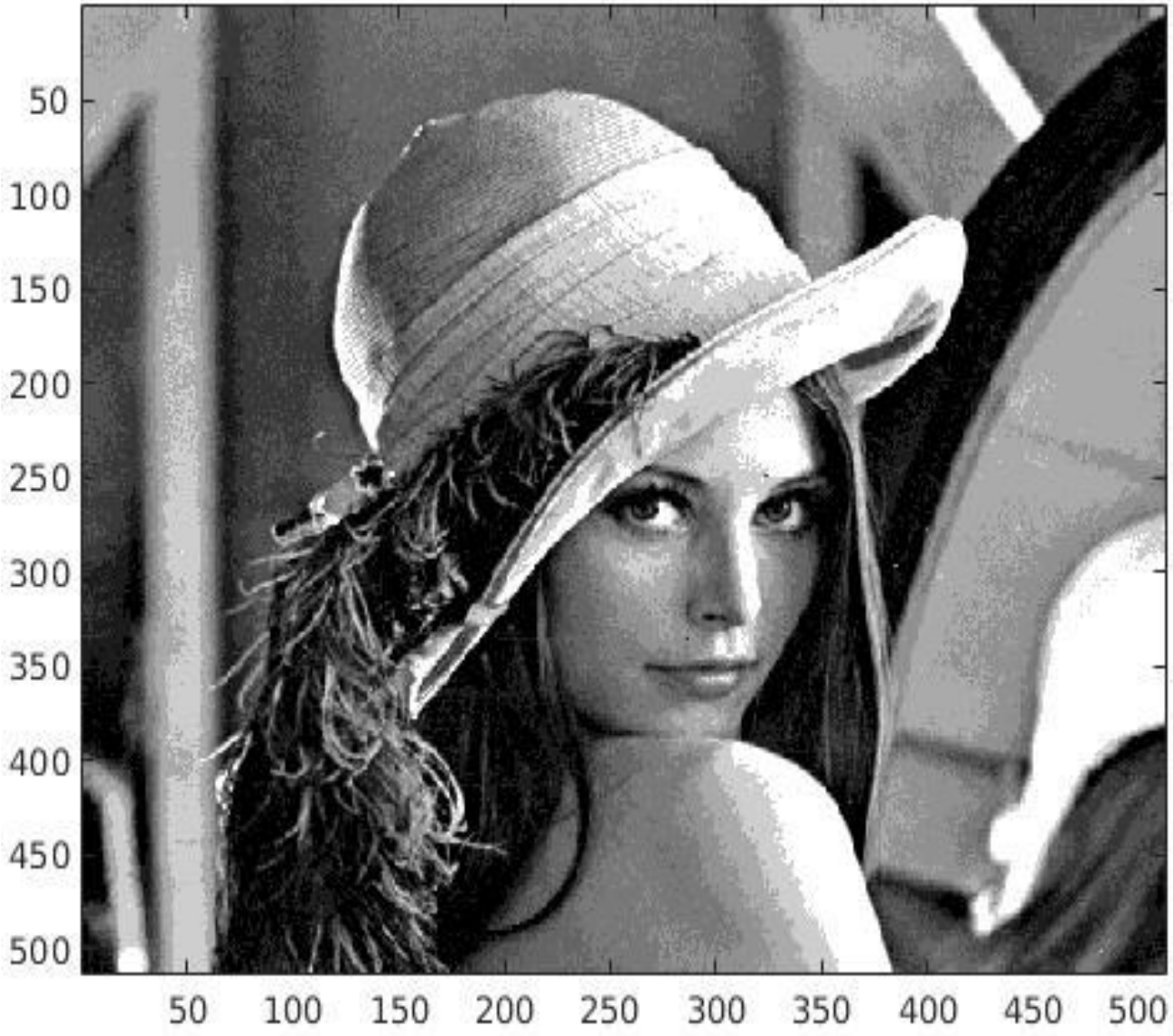
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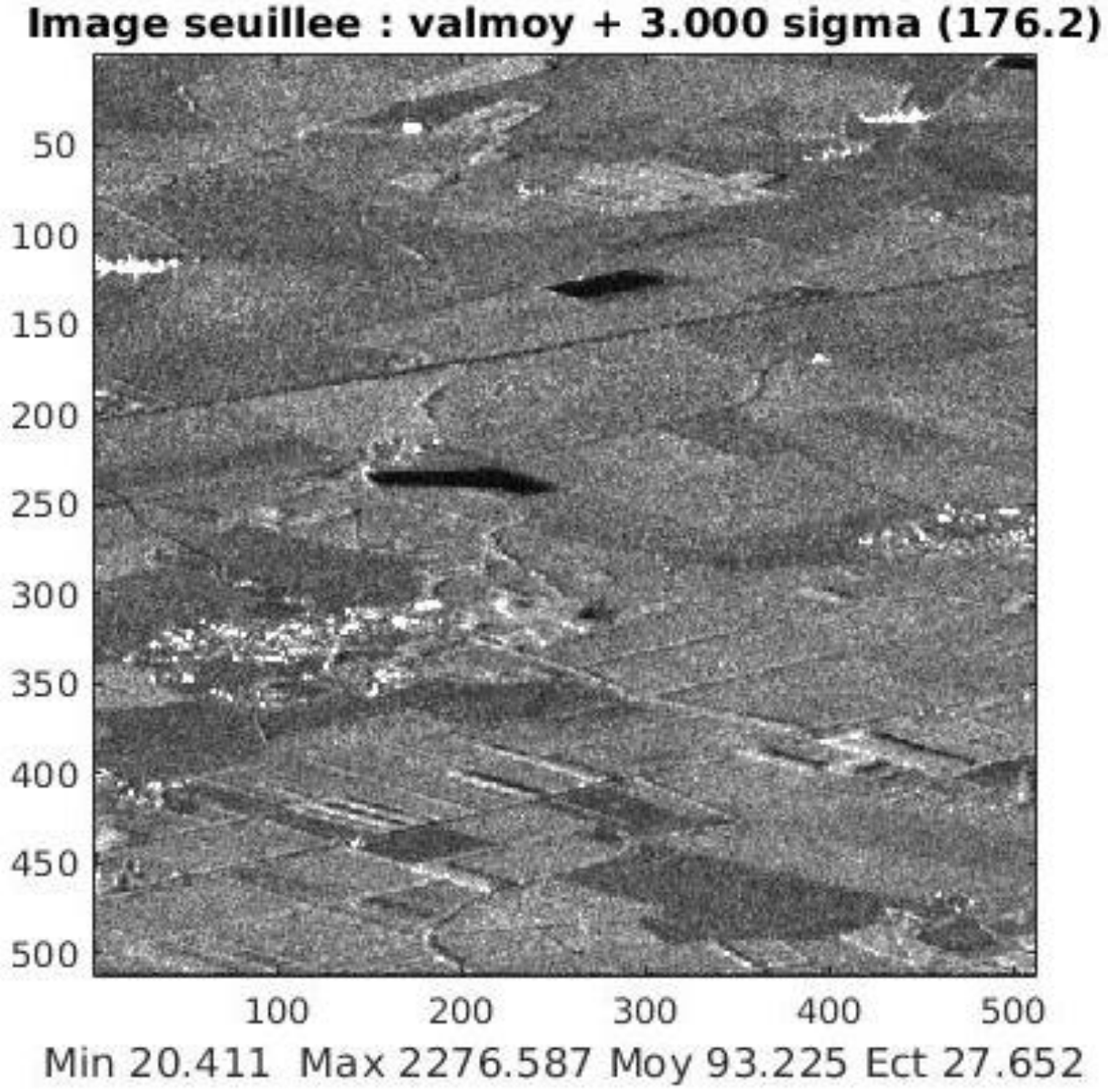
Image seuillee : valmoy + 3.000 sigma (176.2)
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Min 20.411 Max 2276.587 Moy 93.225 Ect 27.652

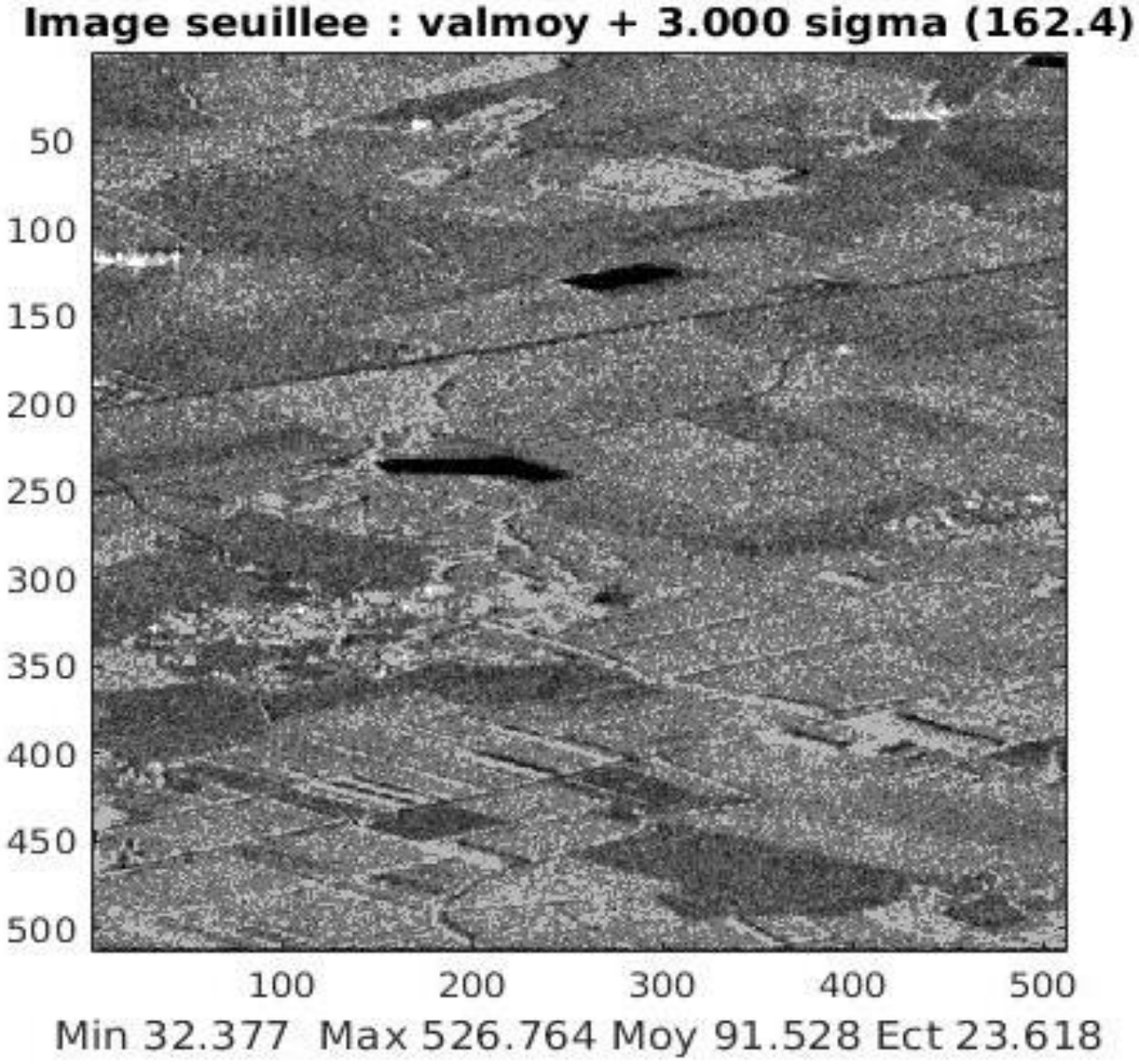
Image seuillee : valmoy + 3.000 sigma (162.4)
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Min 32.377 Max 526.764 Moy 91.528 Ect 23.618

K=10

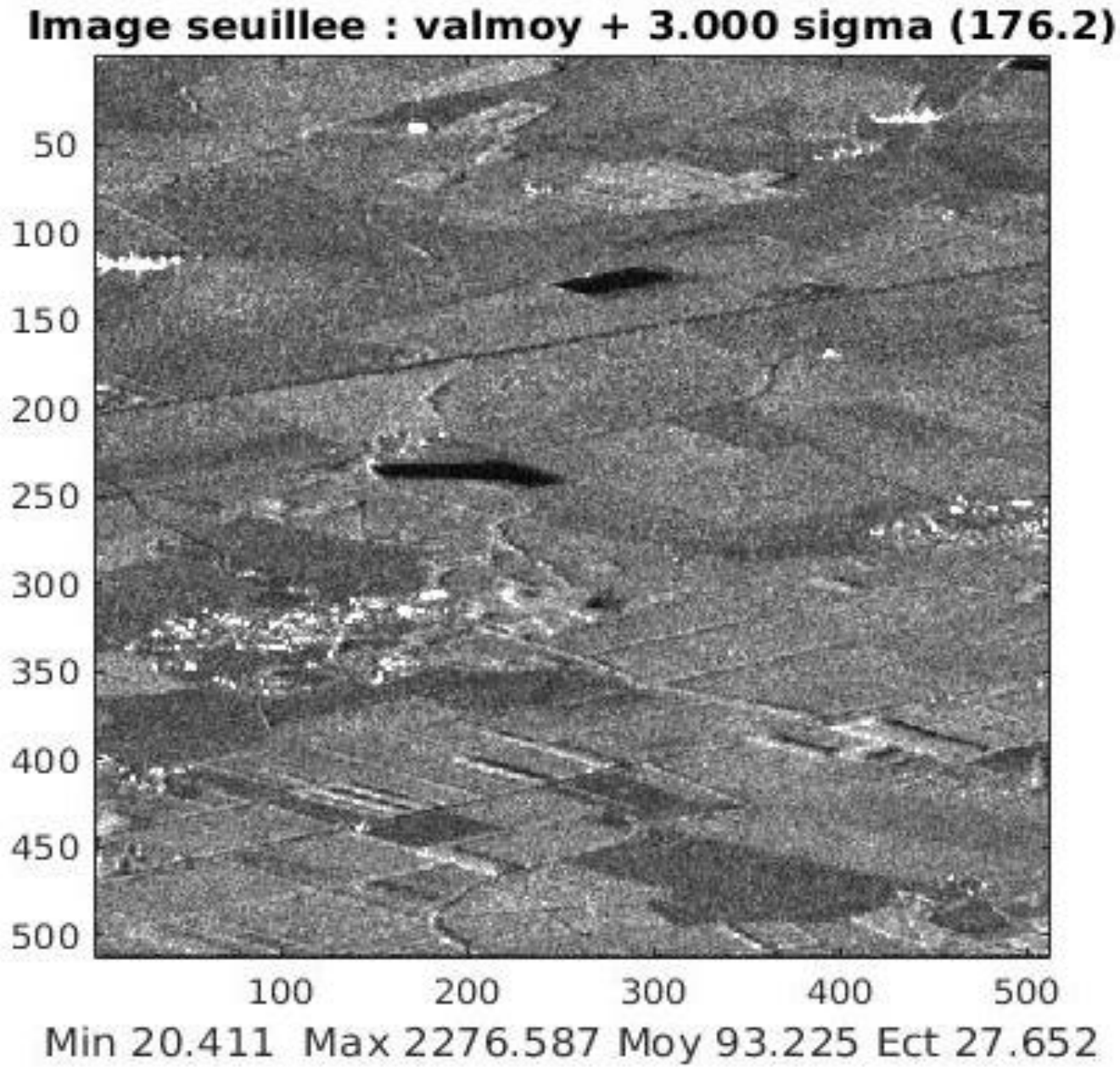
Image seuillee : valmoy + 3.000 sigma (176.2)
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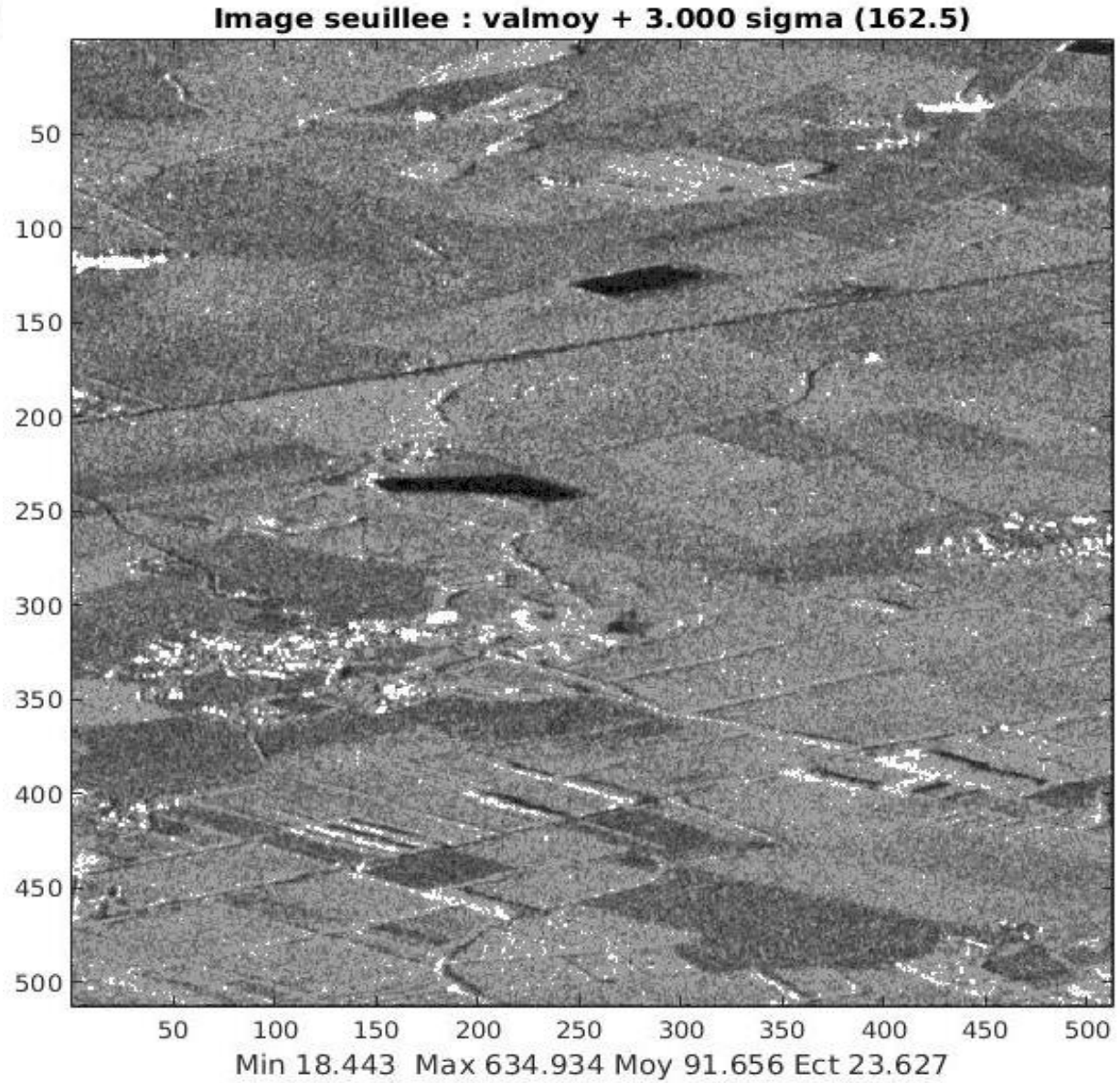
Min 20.411 Max 2276.587 Moy 93.225 Ect 27.652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Min 18.443 Max 634.934 Moy 91.656 Ect 23.627

K=20

SLIC

m=30, 225 superpixels

SIMPLIFICATIONS:

- Initialisation: centres des superpixels dans une grille rectangulaire, plutôt qu'une grille hexagonale
- Initialisation: pas déplacé les centres de superpixels dans le minimum du gradient dans un voisinage 3x3
- Pas de post-processing
- Distance:

$$D = \sqrt{{d_c}^2 + \left(\frac{d_s}{S}\right)^2 m^2}.$$

plutôt que:

$$D' = \sqrt{\left(\frac{d_c}{N_c}\right)^2 + \left(\frac{d_s}{N_s}\right)^2}$$

Source: https://infoscience.epfl.ch/record/177415

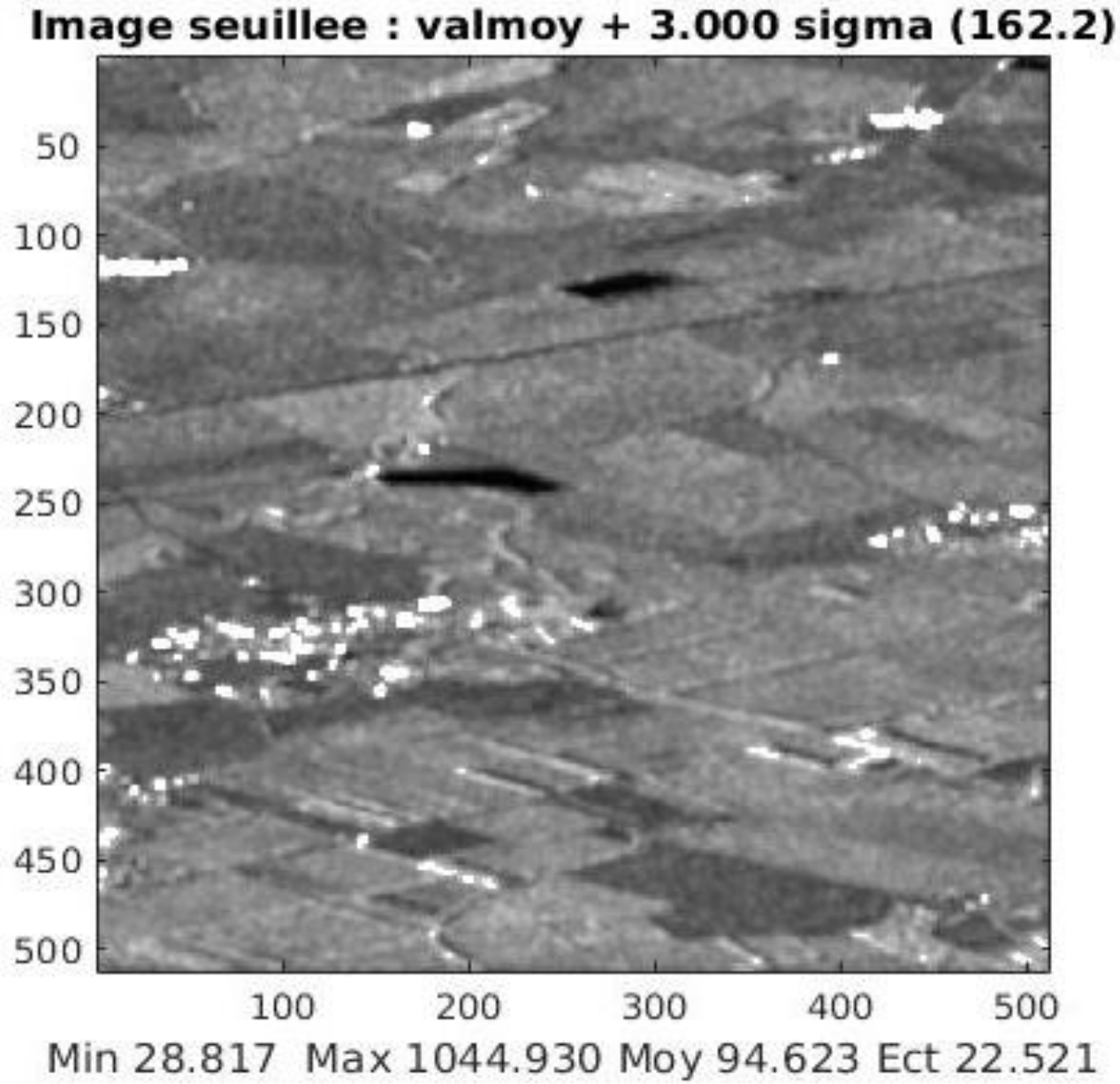
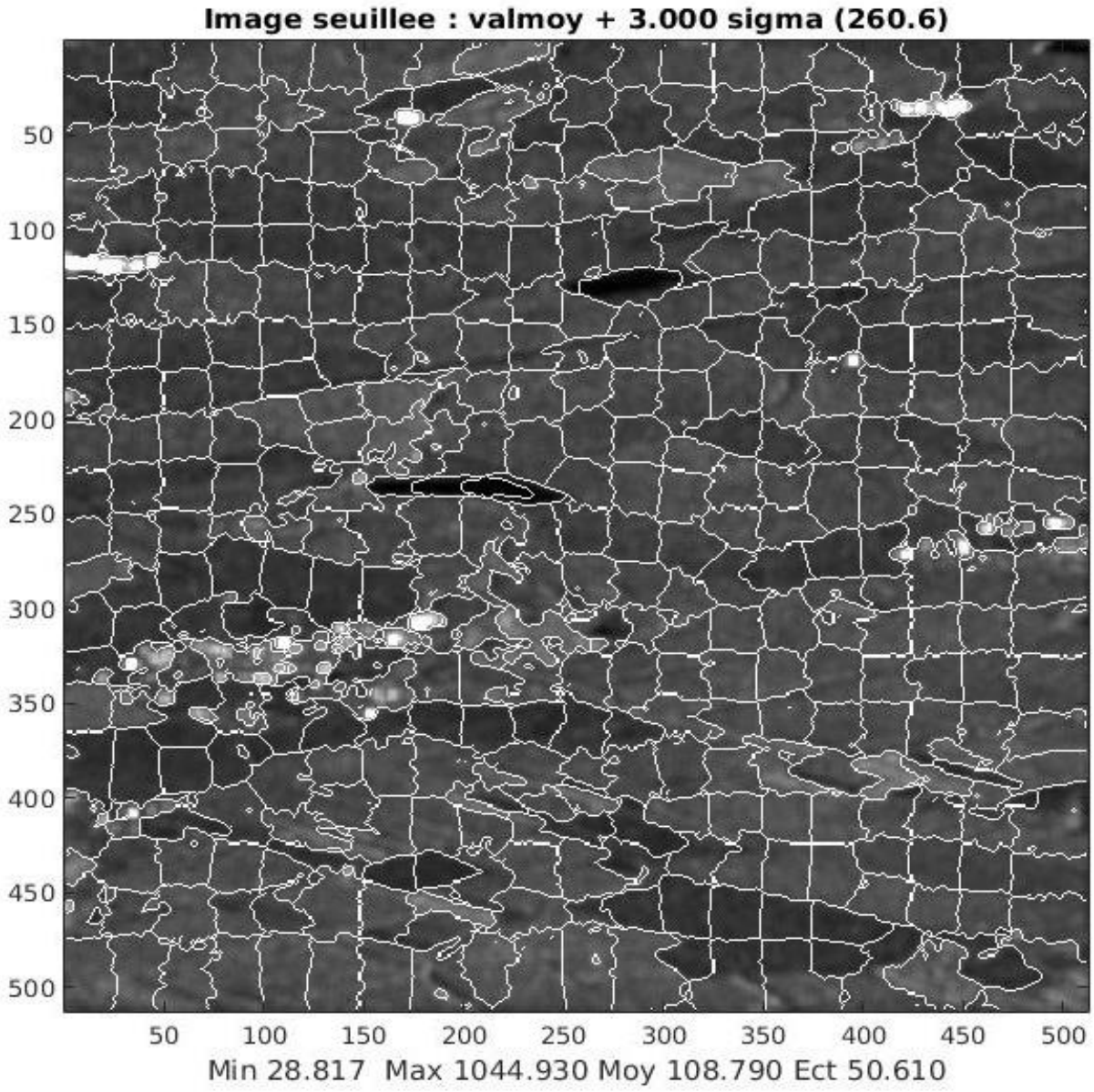
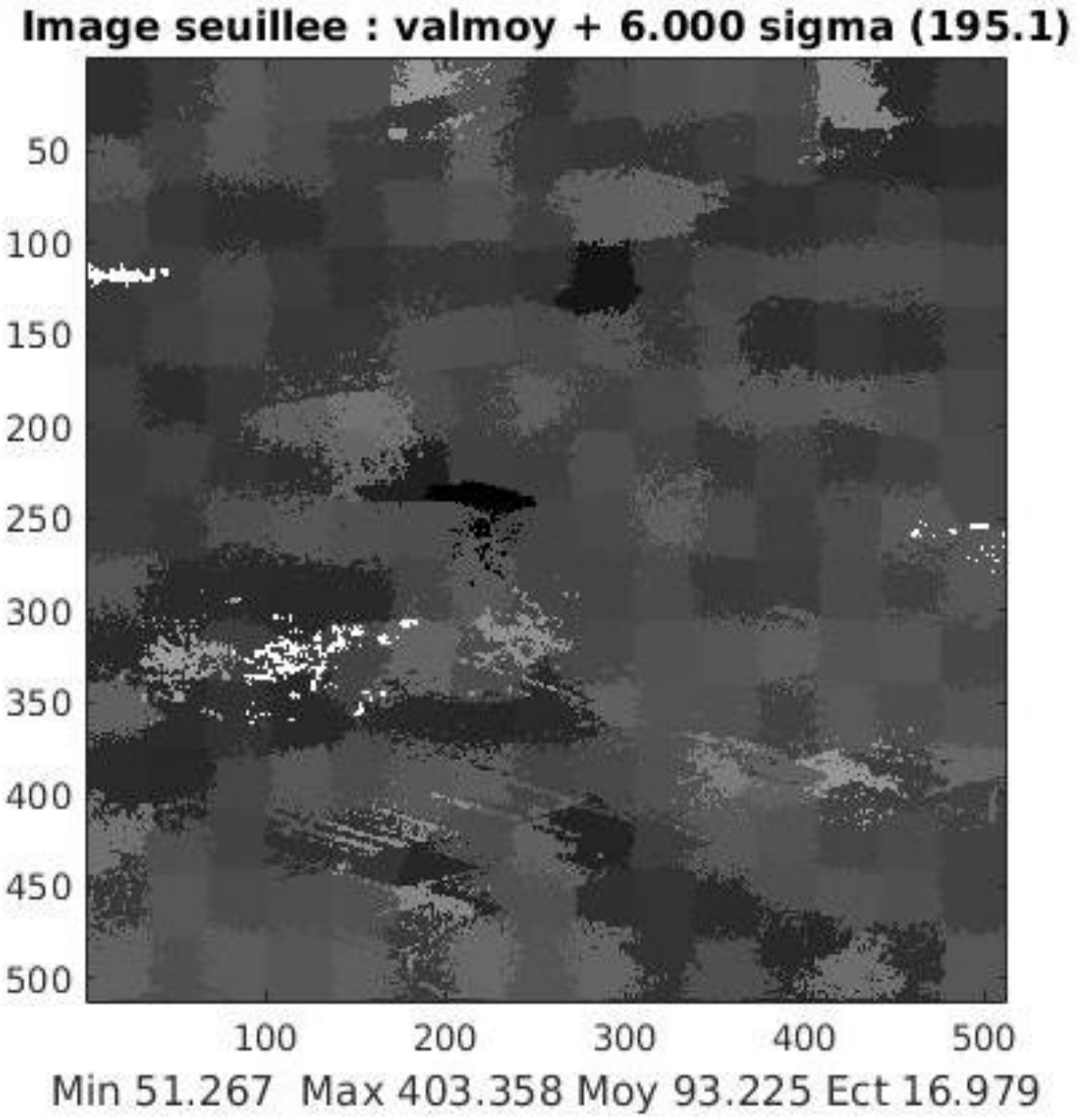


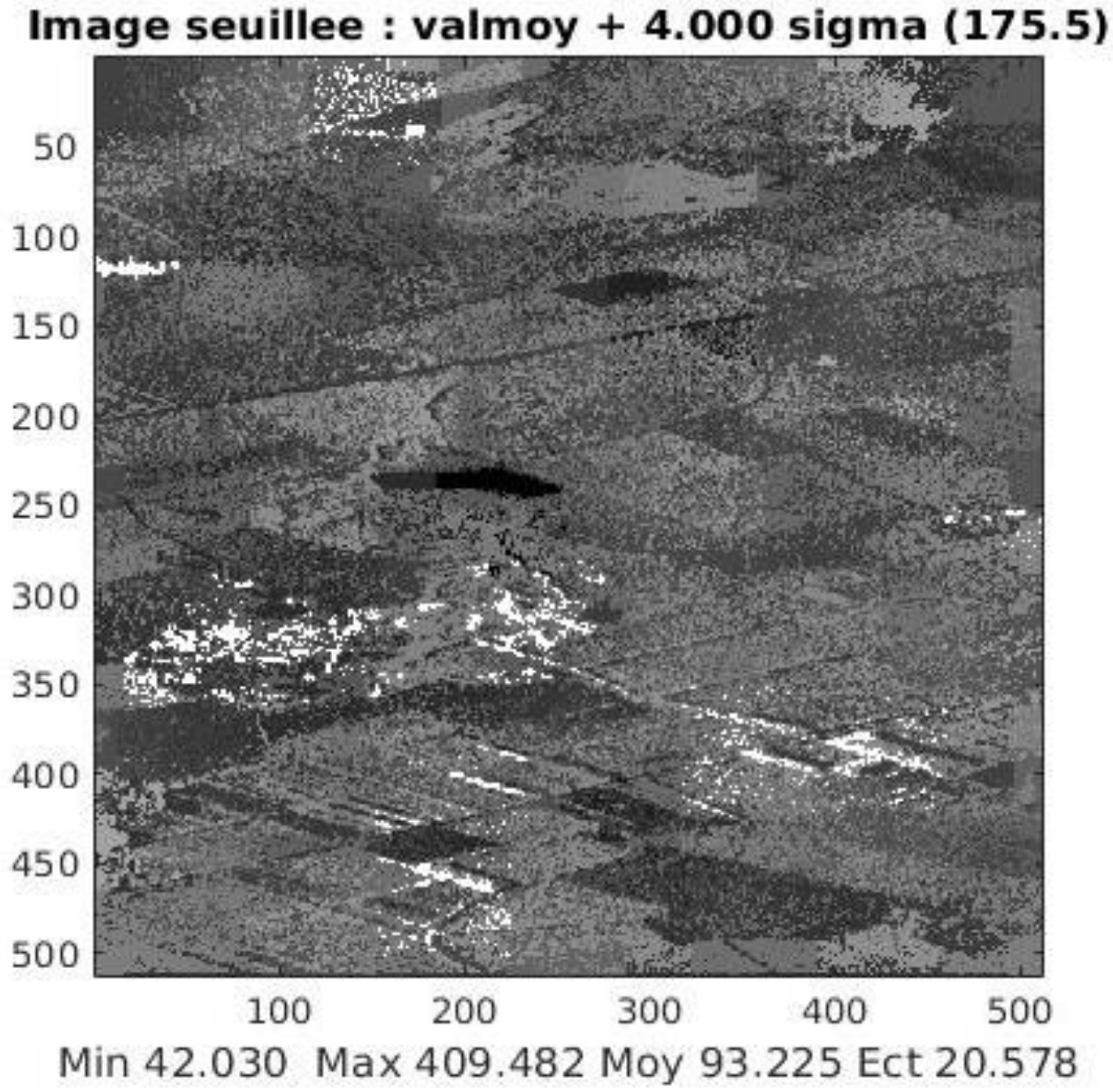
Image moyennée 5x5



m=20, 400 superpixels

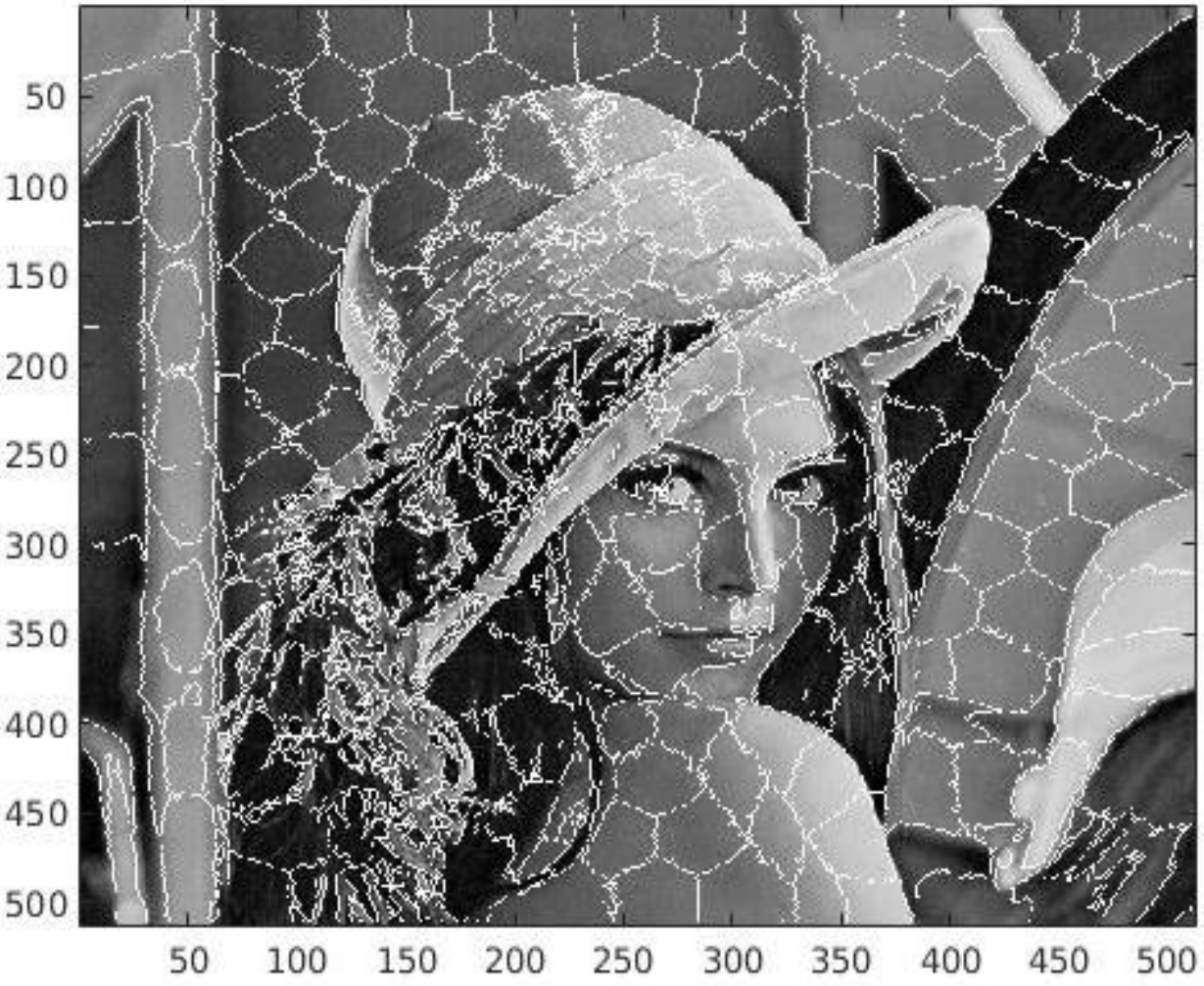


m=40, 225 superpixels



m=10, 225 superpixels

RESULTATS EXPERIMENTAUX



m=30, 200 superpixels

Nous avons utilisé le code de SLIC de Peter Kovesi, qu'on peut trouver sur ce lien :

http://www.peterkovesi.com/projects/segmentation/

Nous l'avons adapté pour pouvoir l'utiliser avec des images en niveaux de gris.

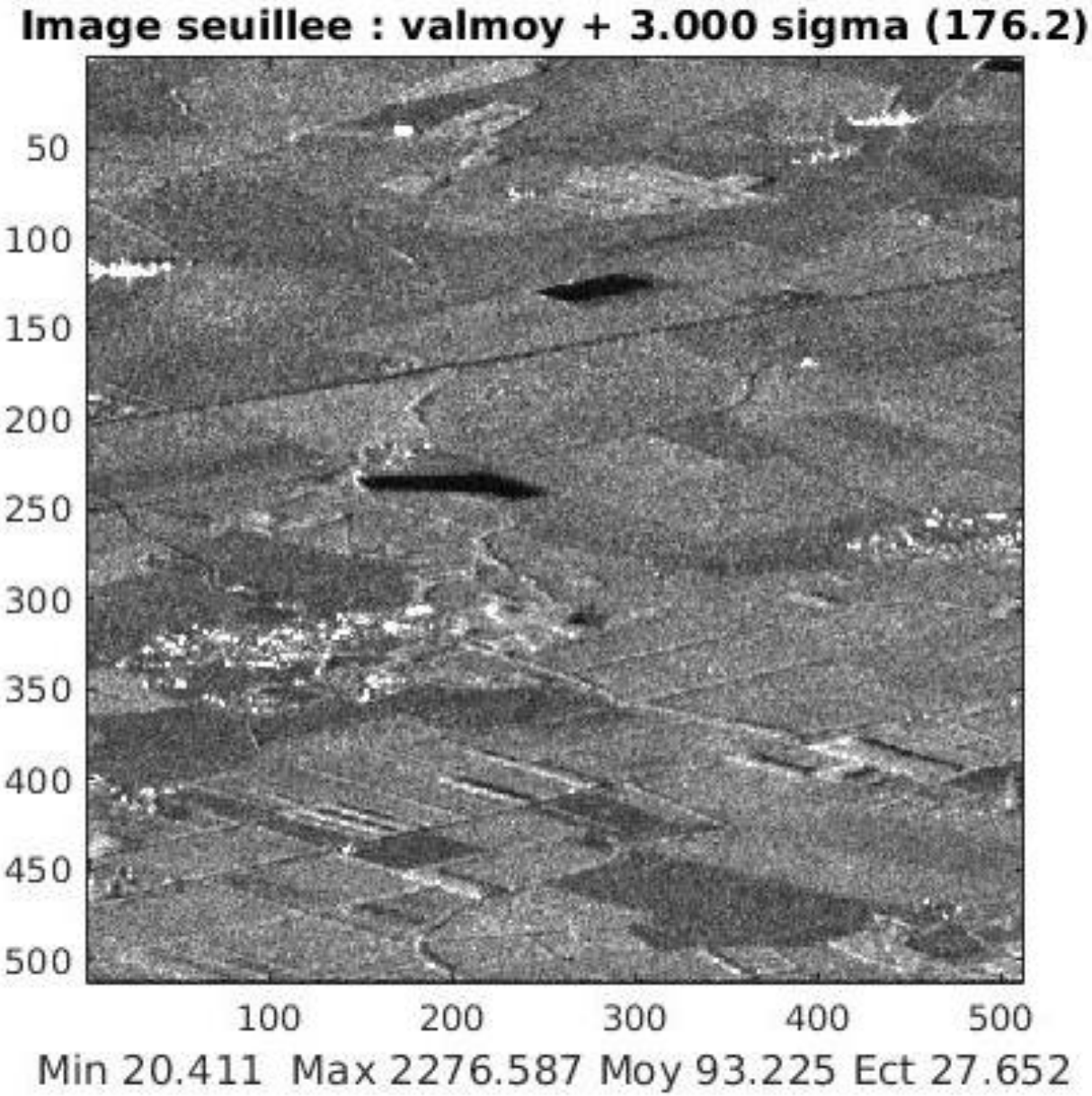
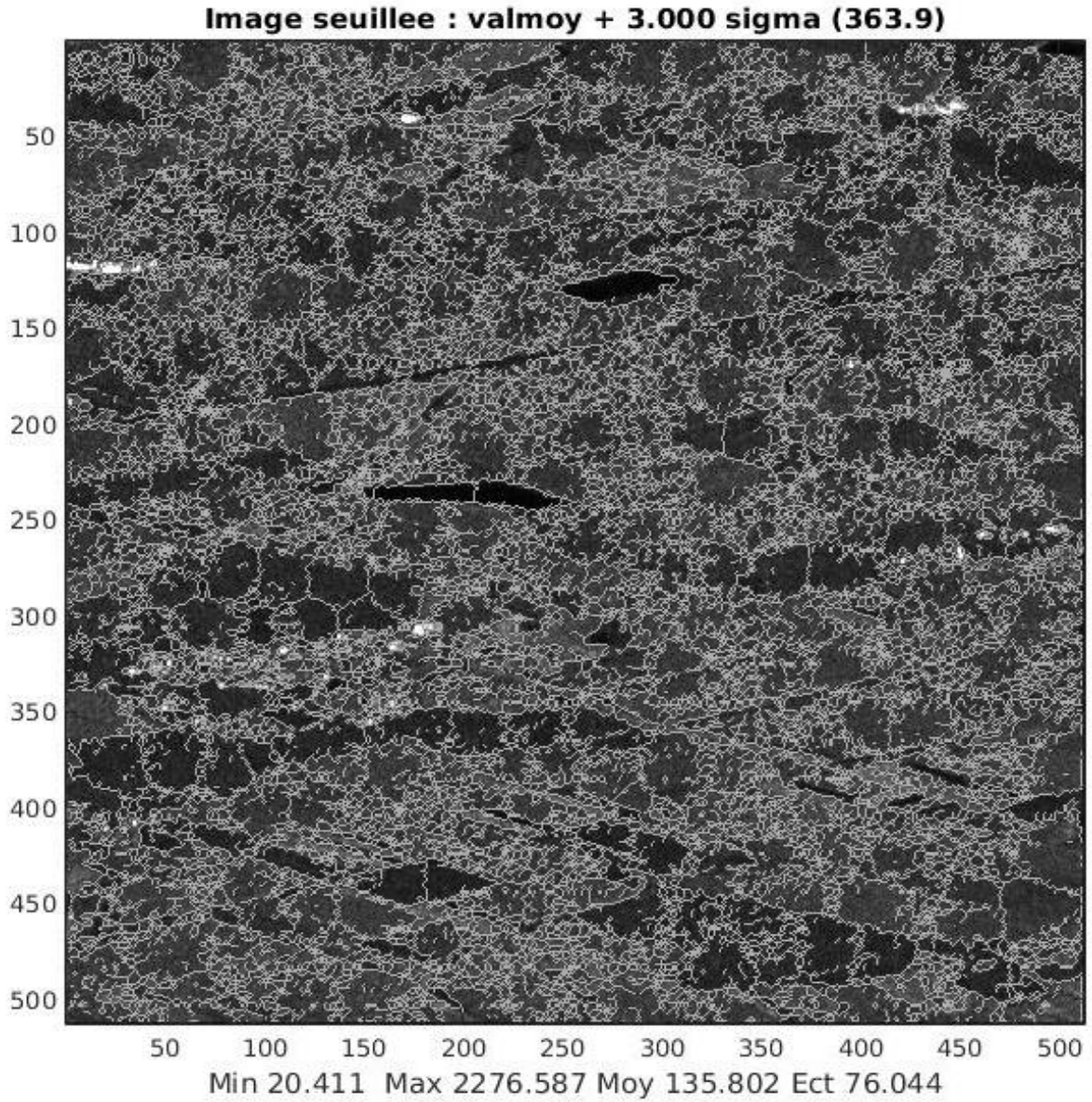


Image non filtrée



m=20, 400 superpixels

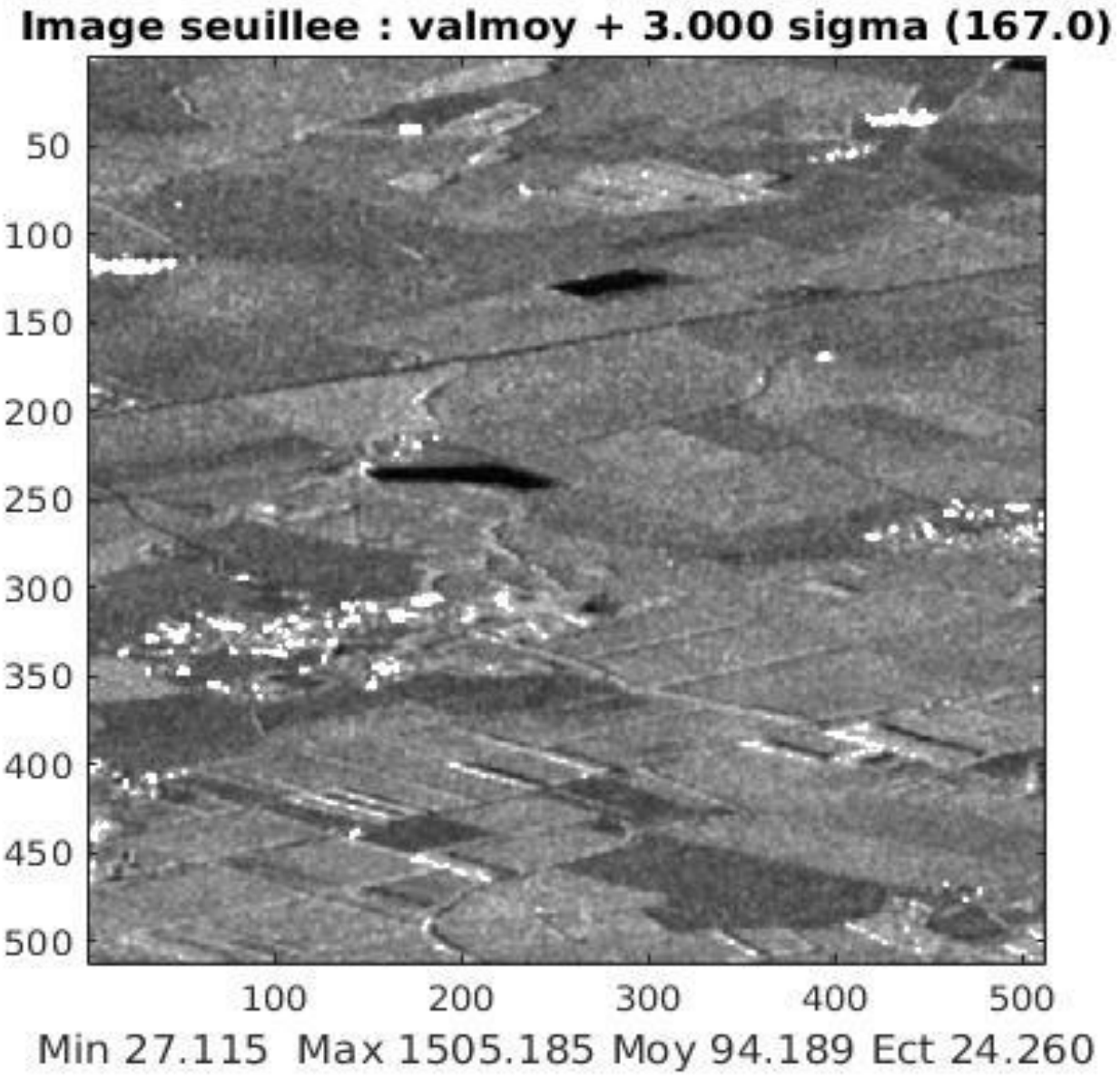
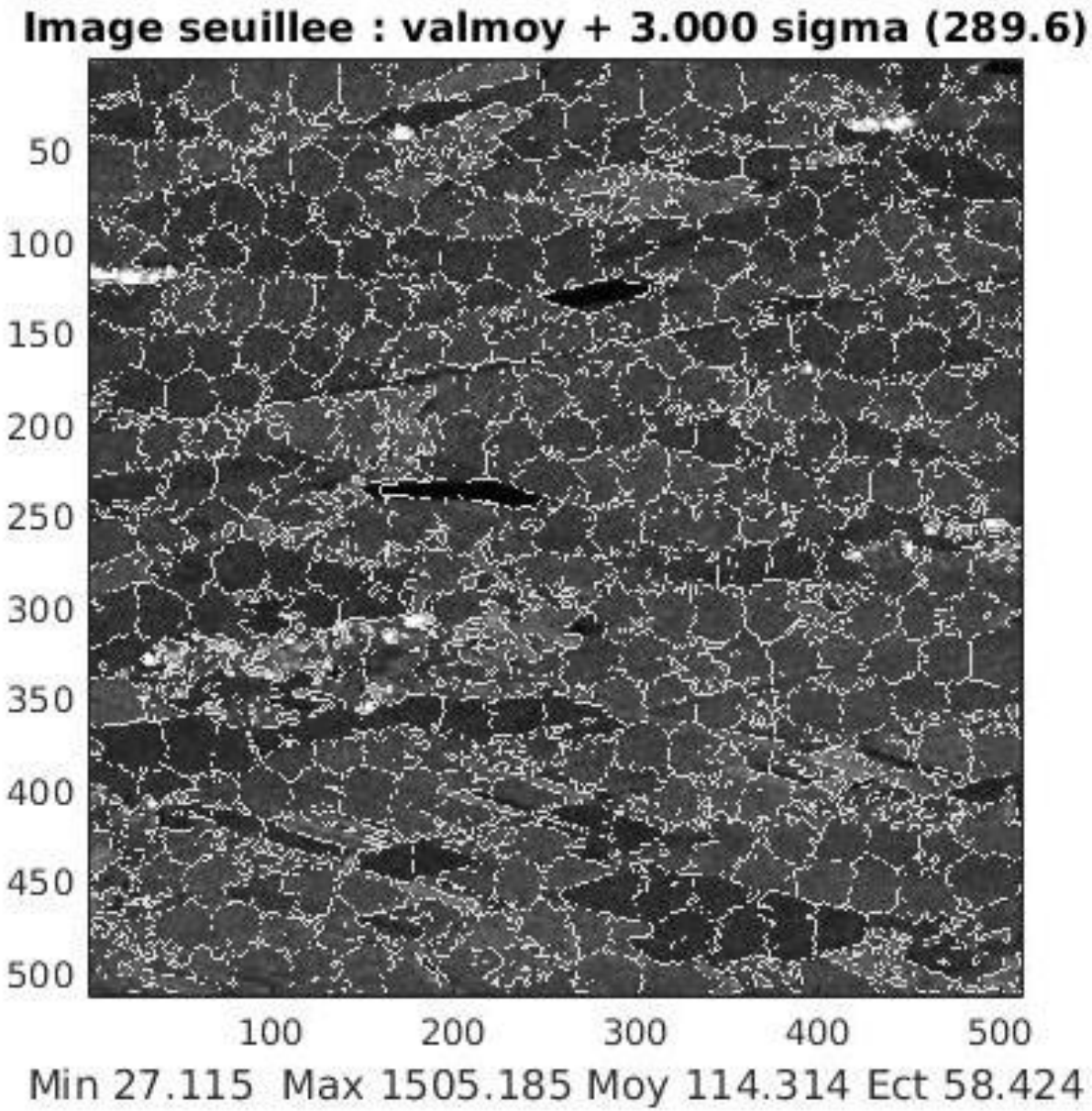


Image moyennée 3x3



m=20, 400 superpixels

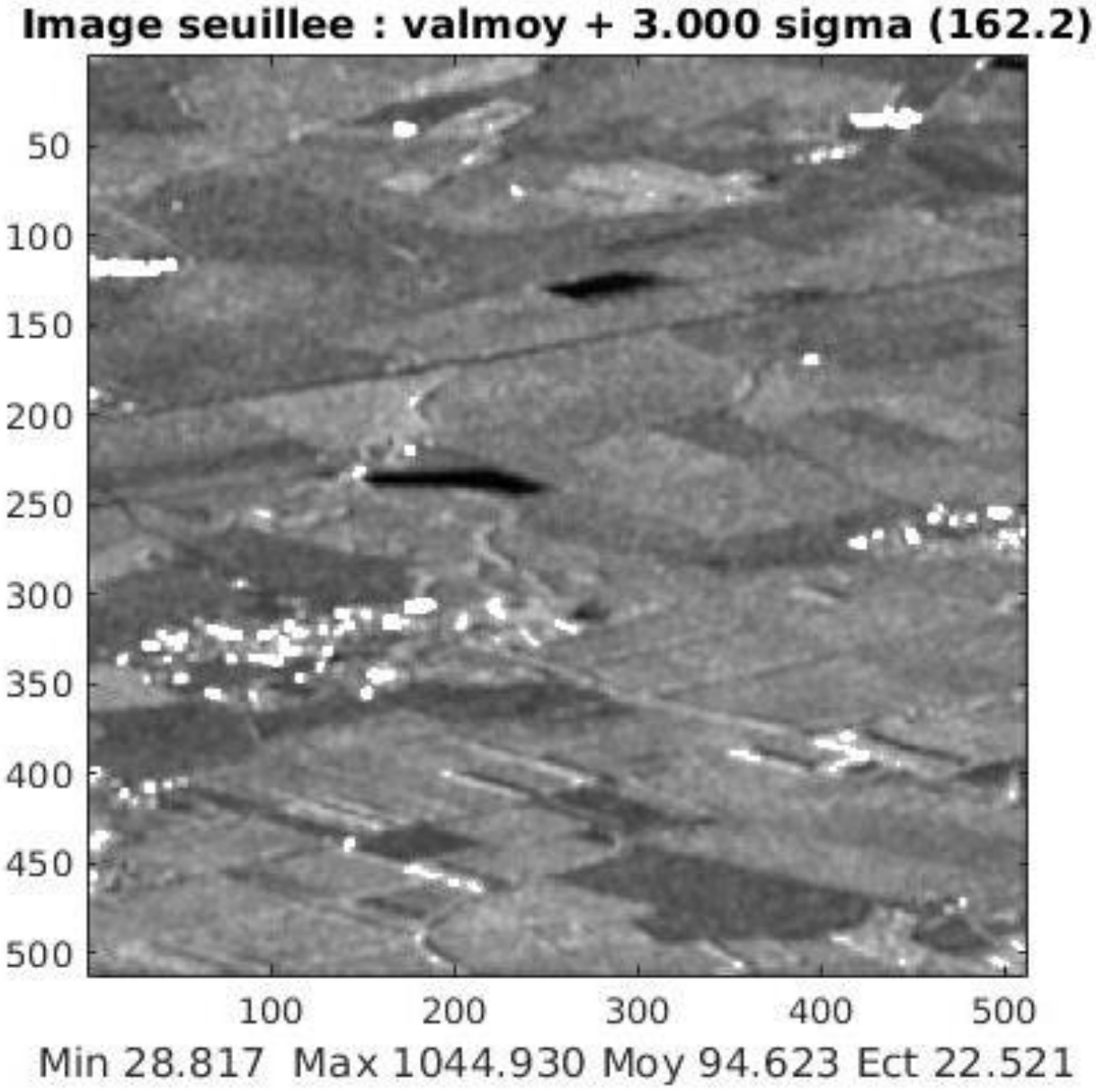
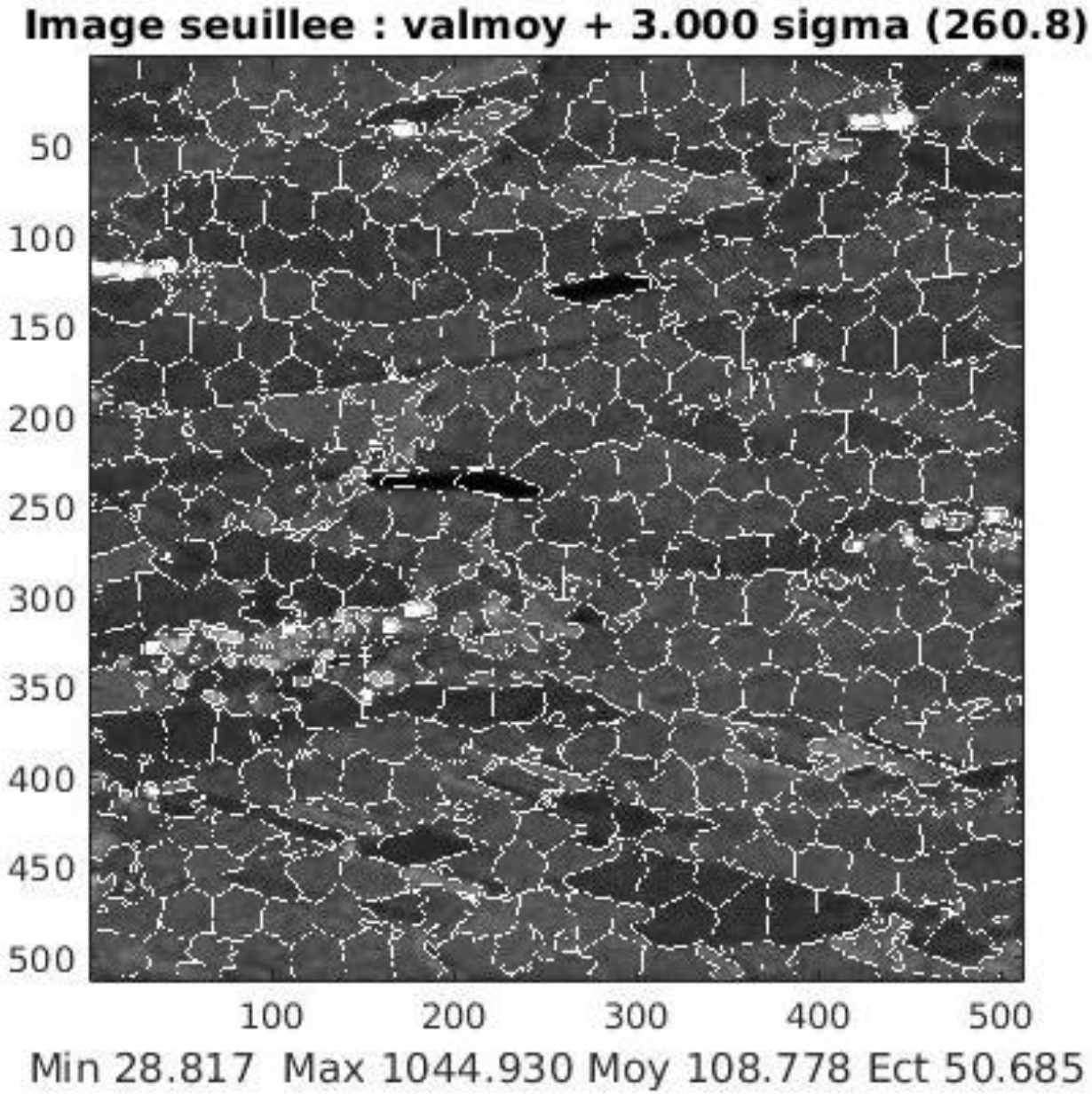


Image moyennée 5x5



m=20, 400 superpixels

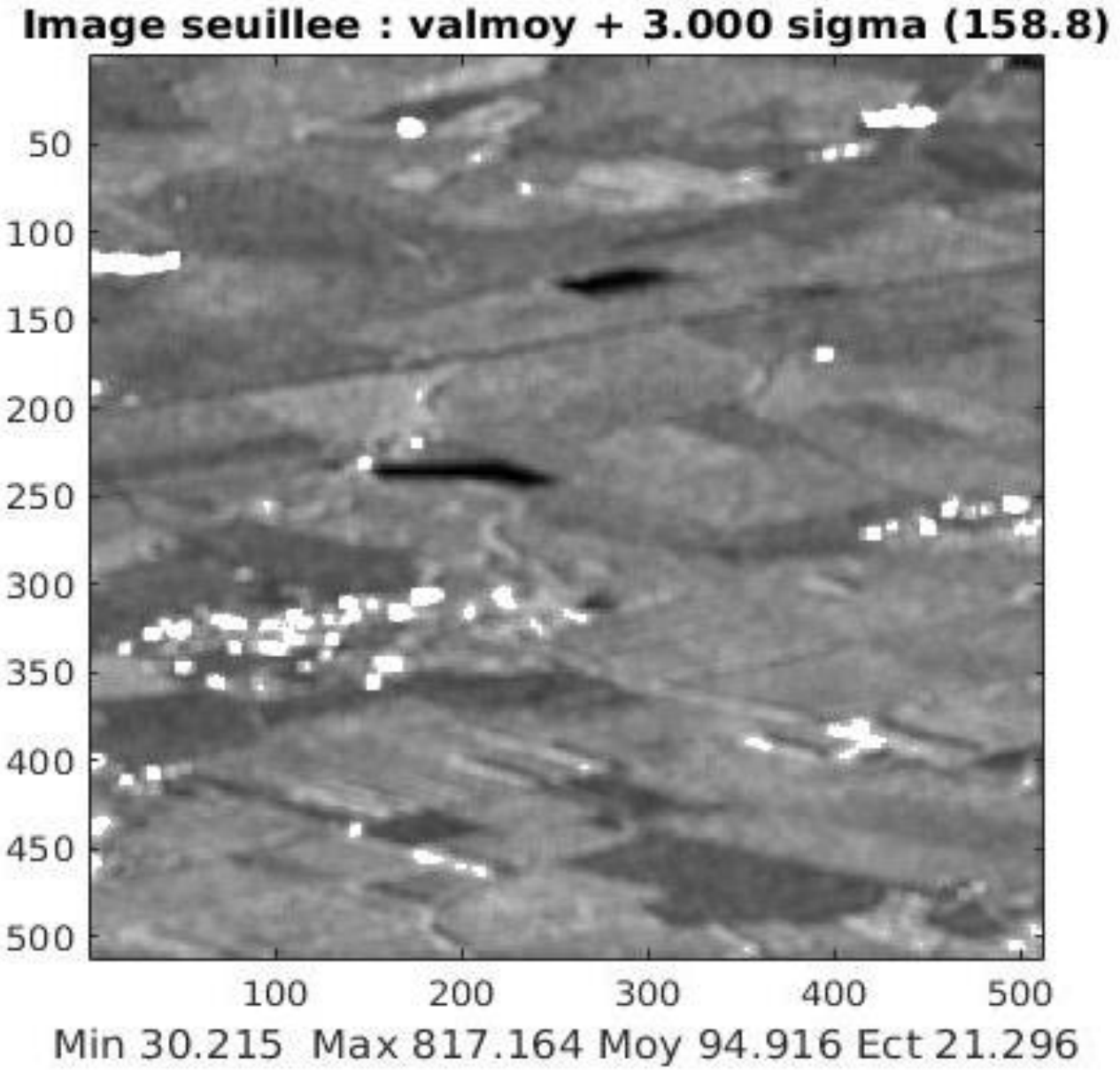
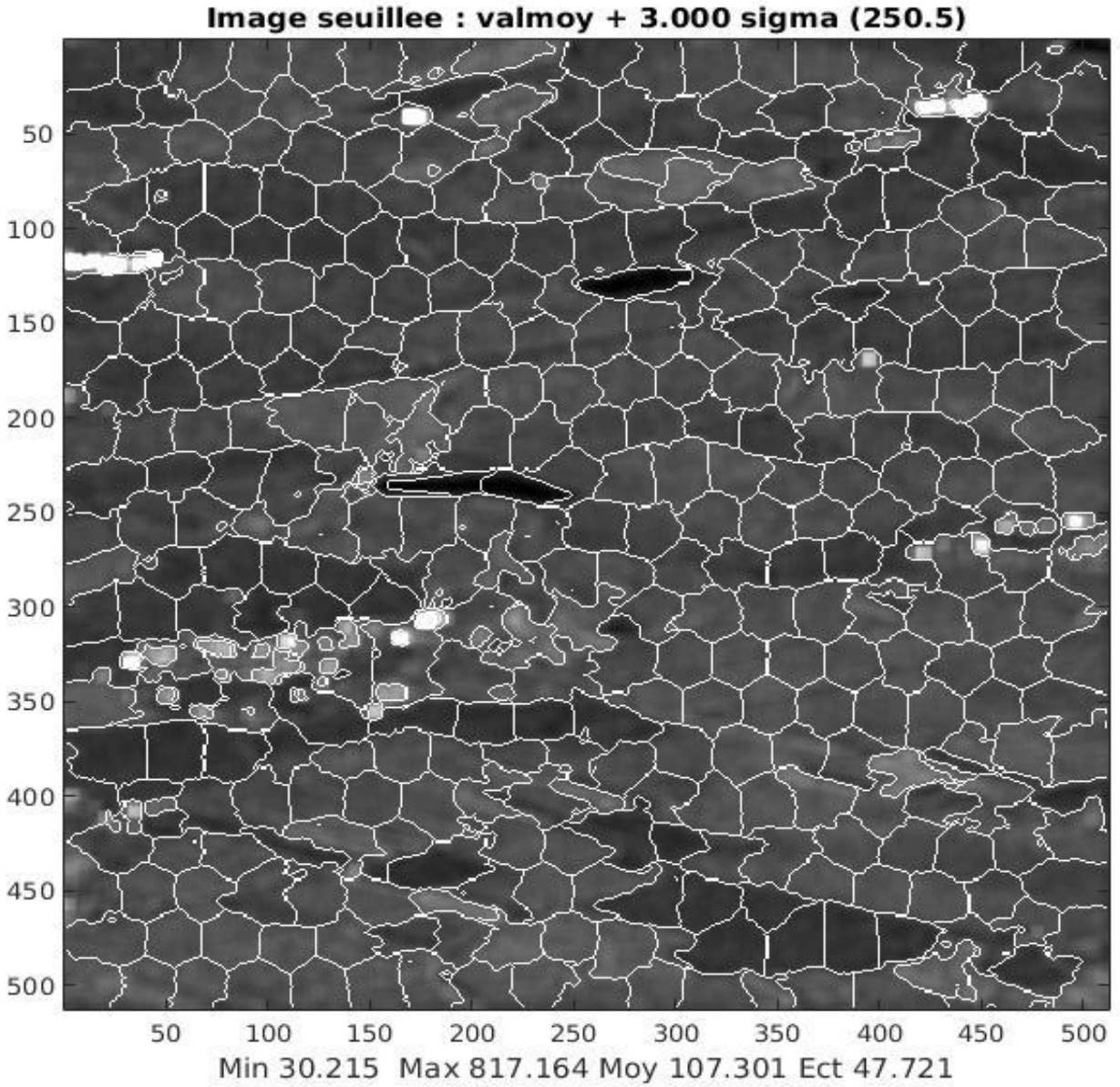


Image moyennée 7x7



m=20, 400 superpixels

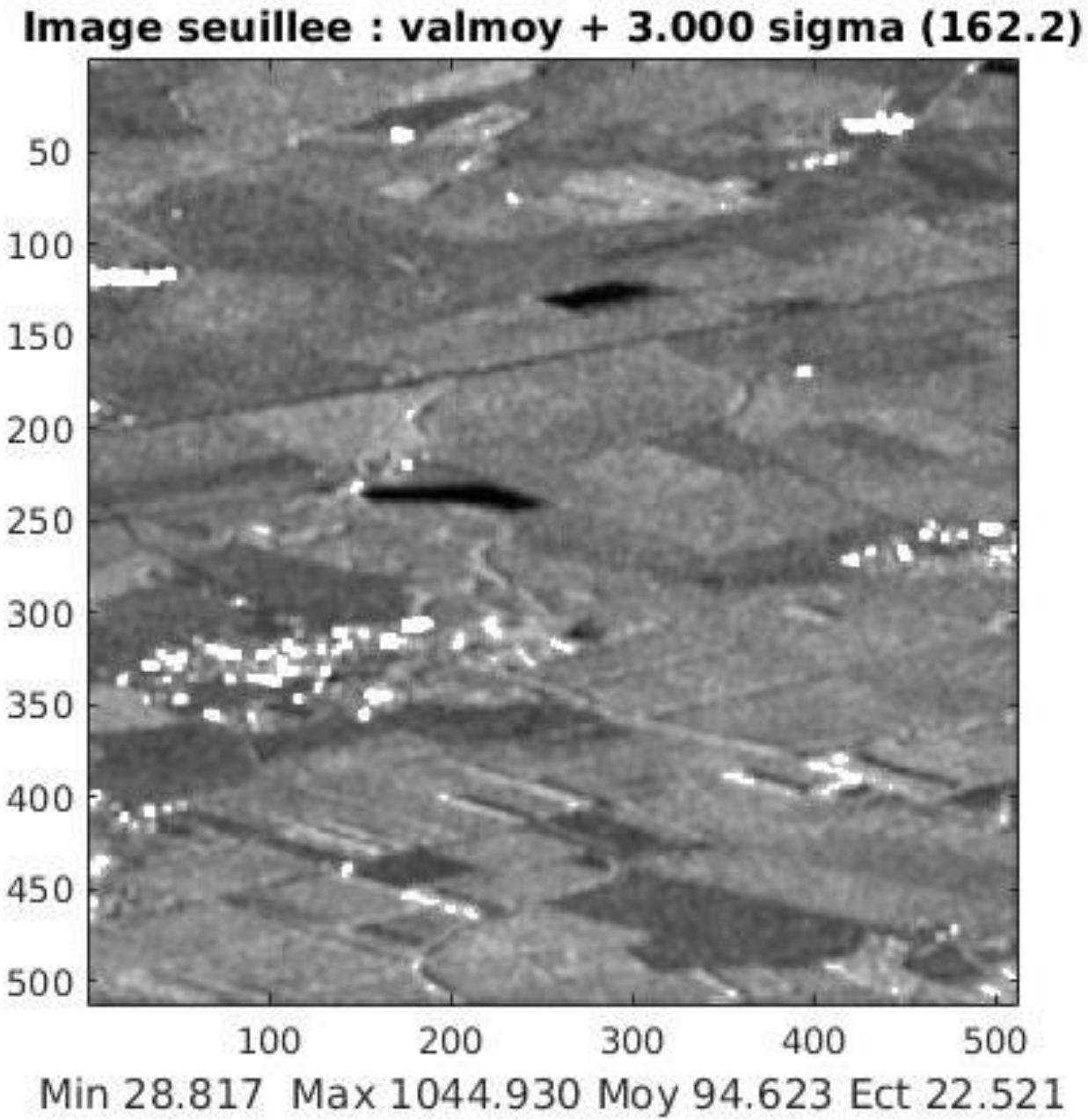
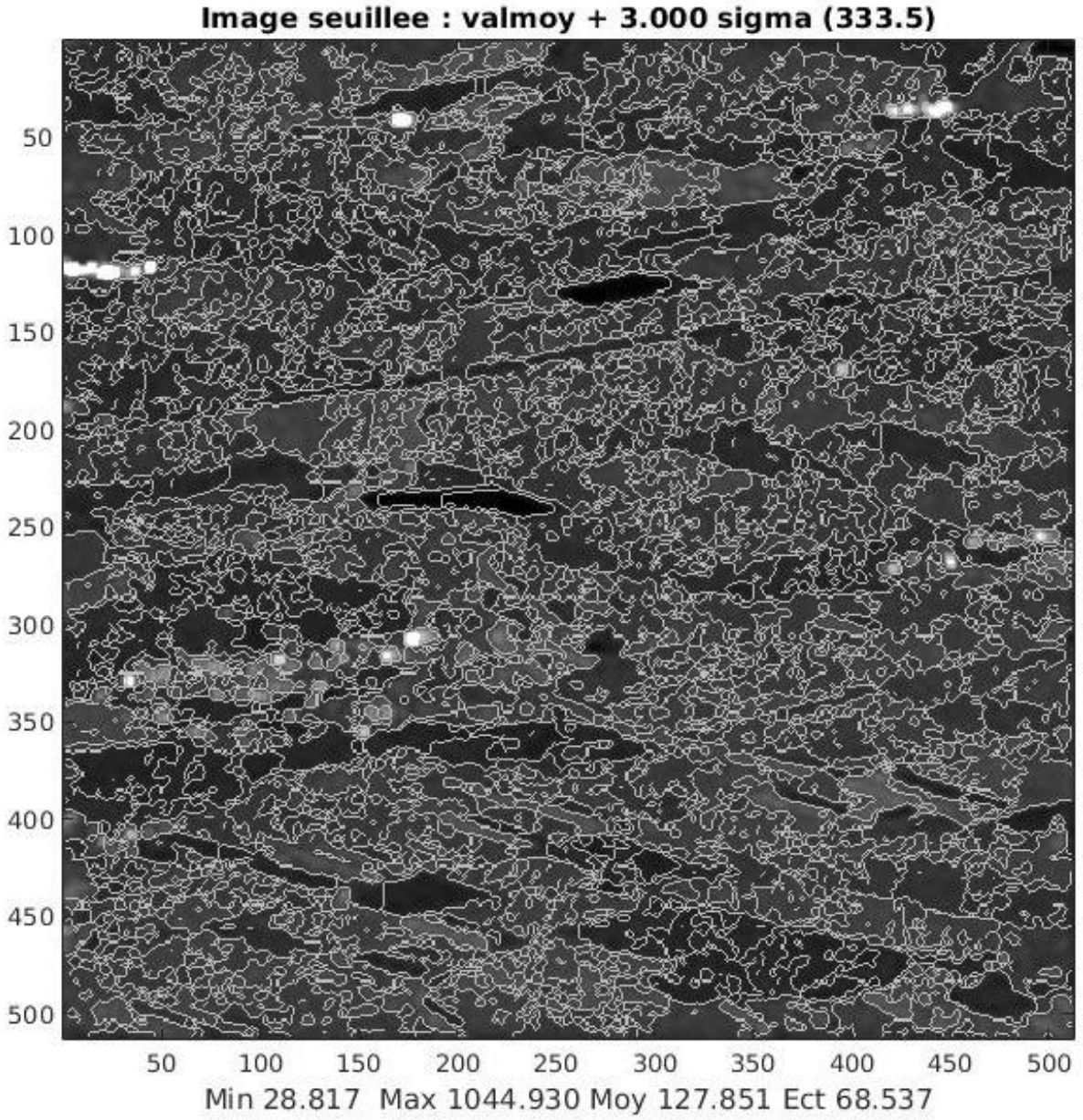


Image moyennée 5x5



m=5, 400 superpixels

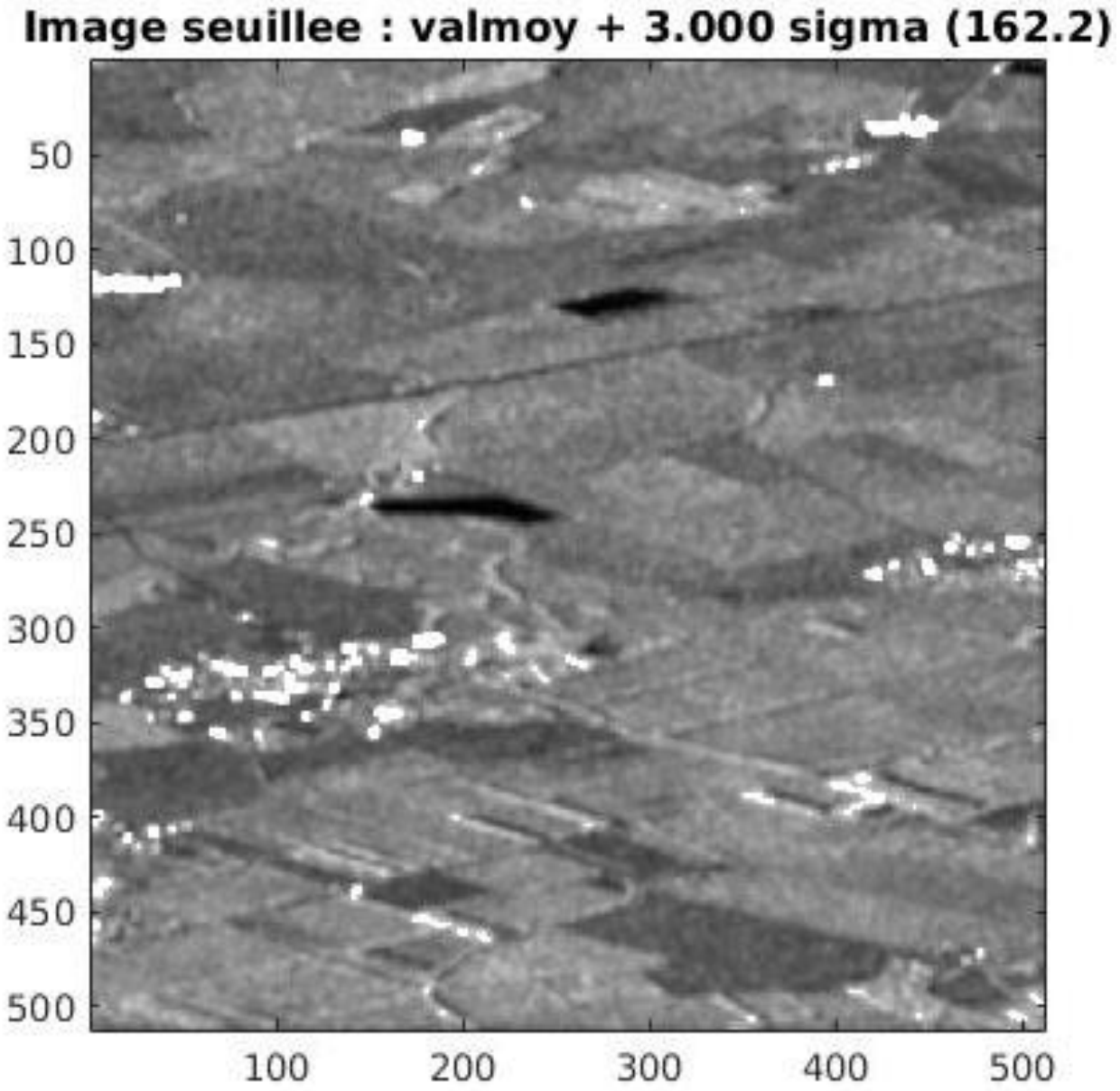
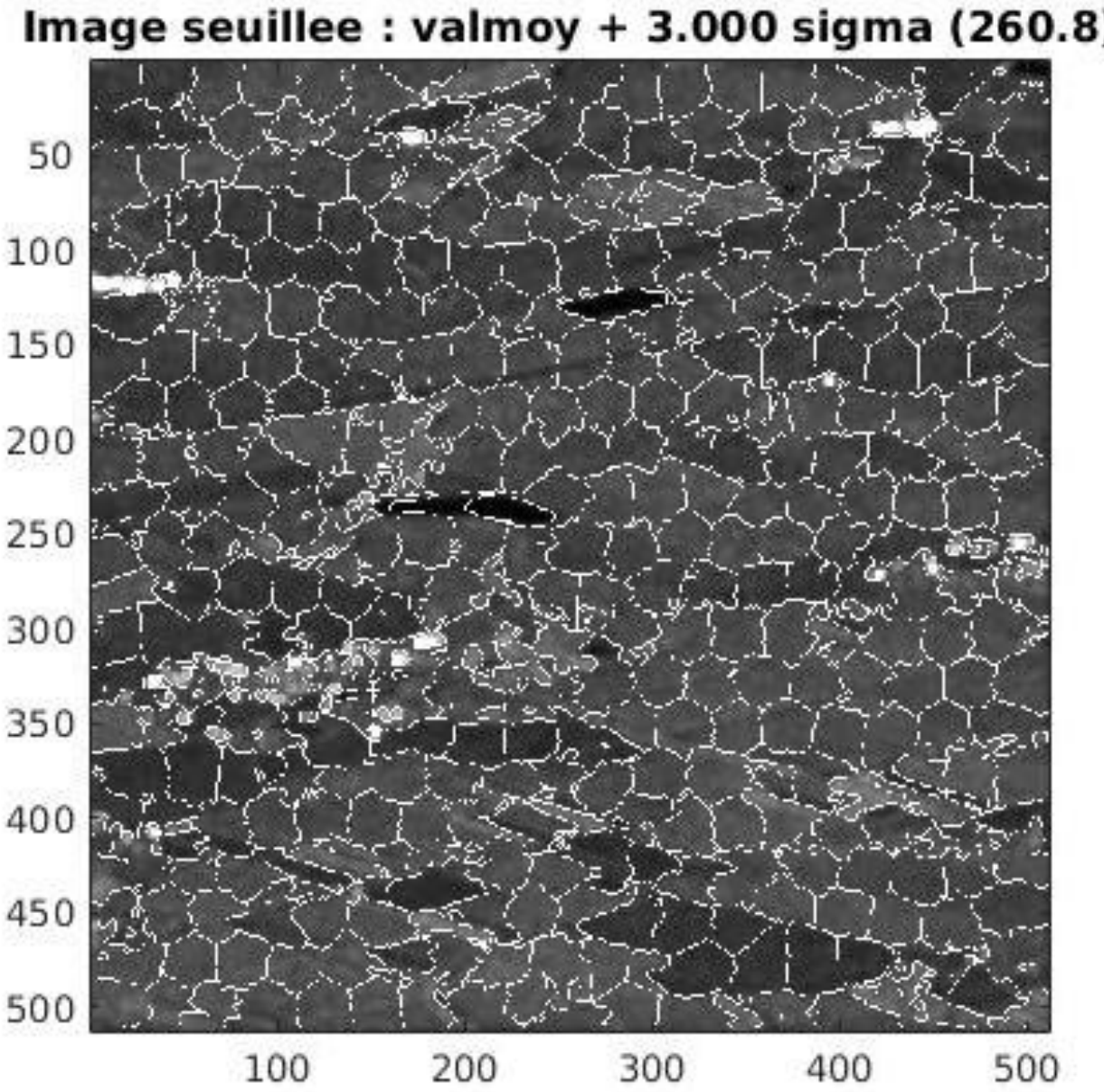


Image moyennée 5x5



m=20, 400 superpixels

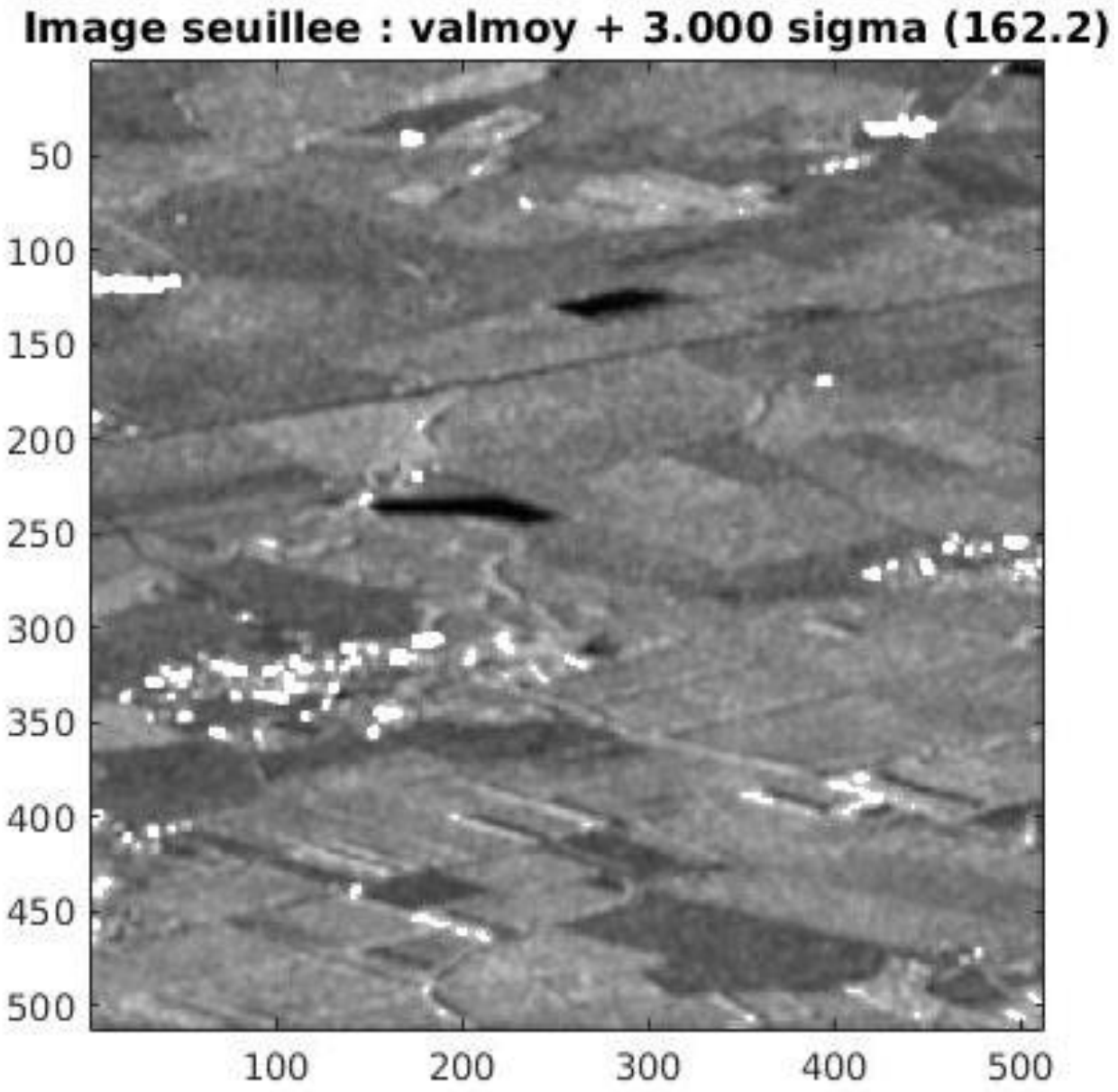
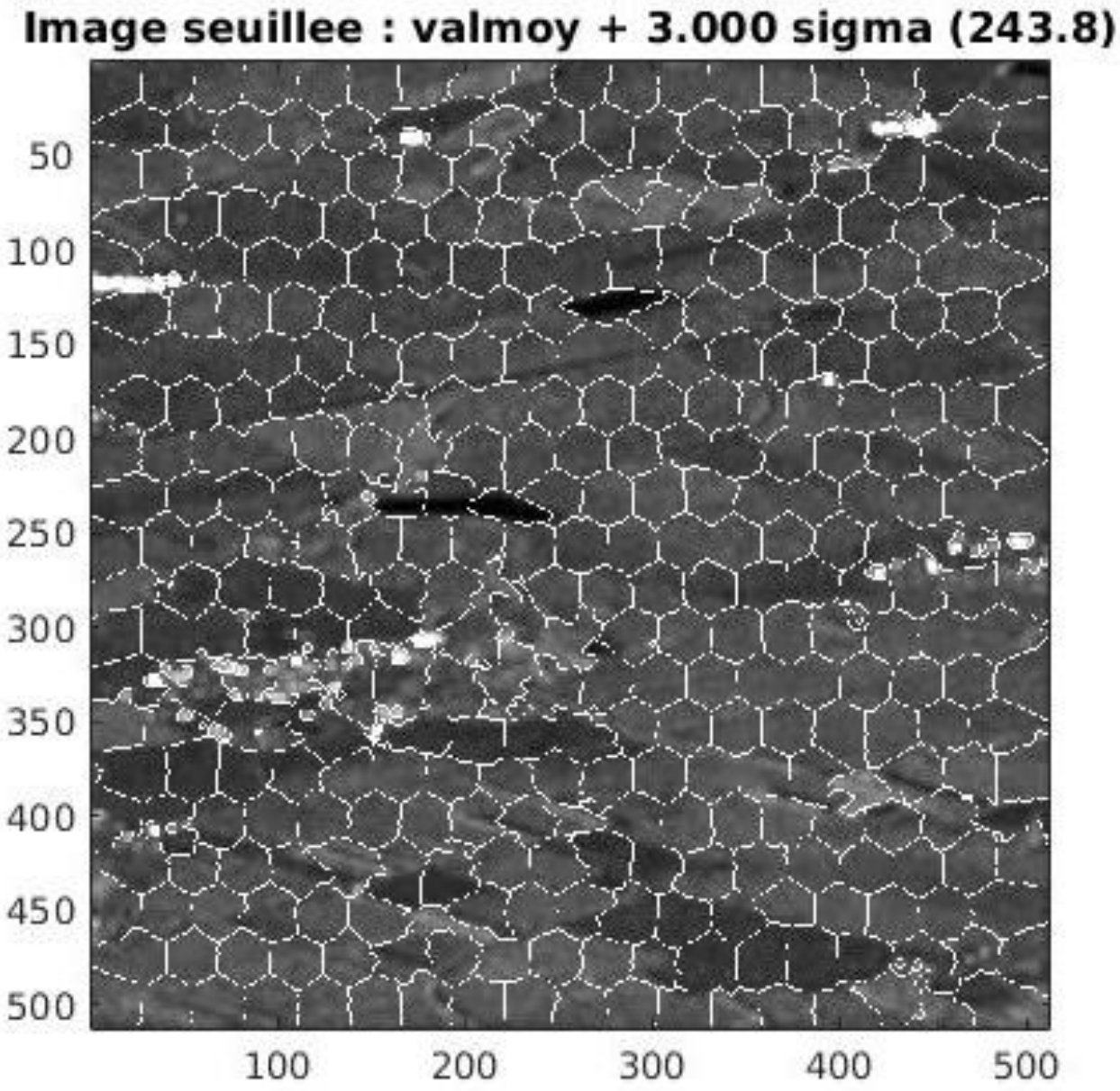


Image moyennée 5x5



m=40, 400 superpixels

CONCLUSIONS

Pour avoir une bonne segmentation d'une image SAR multi-temporelle il faut:

- Filtrer l'image pour réduire le bruit

- Choisir un bon compromis entre régularité des superpixels et adhésion aux contours en choisissant le paramètre m.