Temporal decorrelation in GBSAR images

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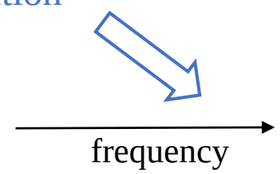
$$\gamma(t) \simeq e^{-t/\tau}$$

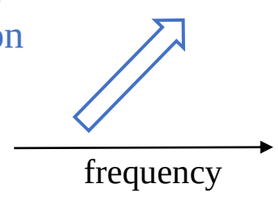
decorrelation time

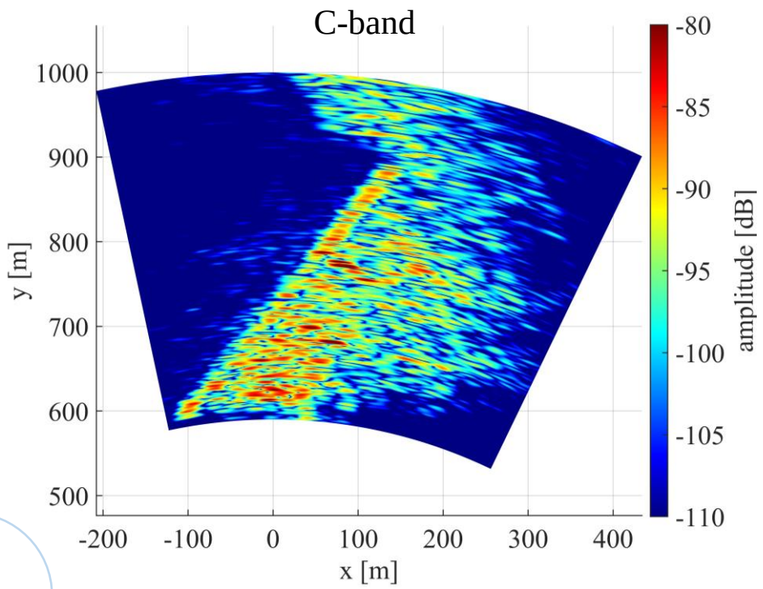
$$\tau \propto \lambda^2$$



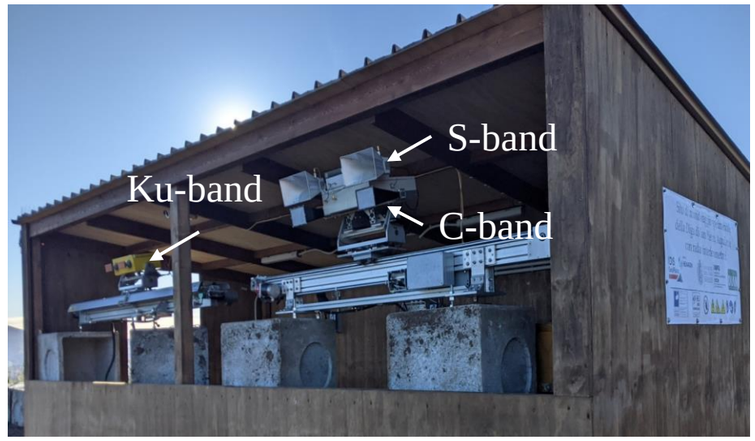
angular resolution

$$\Delta\vartheta \simeq \frac{\lambda}{2L}$$





GBSAR (Ground-Based Synthetic Aperture Radar) monitoring campaign of a vegetated tailings dam, Aquilonia, Italy.



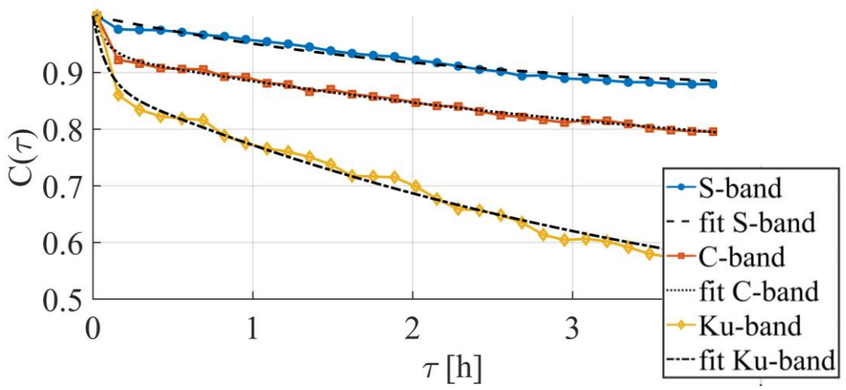
Sum of exponential model

$$\gamma(t) = \gamma_F\, e^{-\frac{t}{\tau_F}} + \gamma_S\, e^{-\frac{t}{\tau_S}} + \gamma_\infty$$

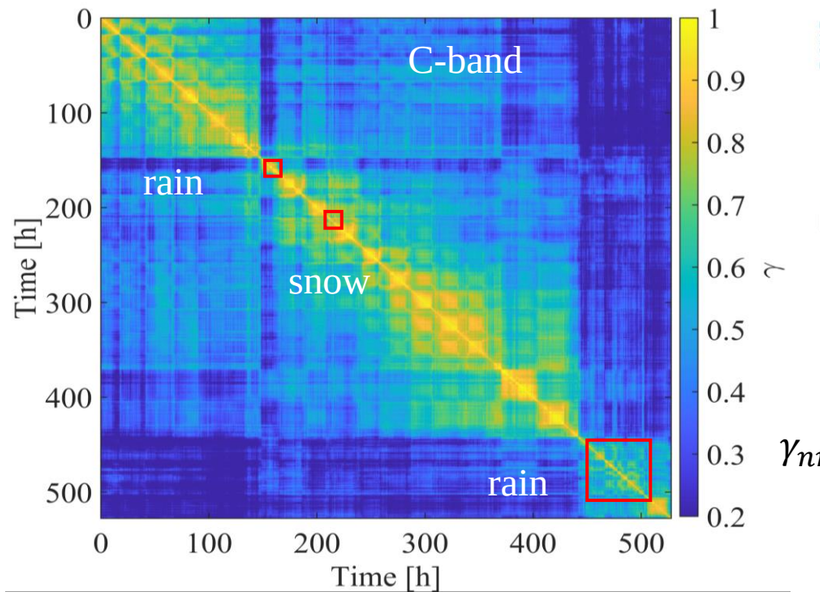
Fast decorrelation — Slow decorrelation

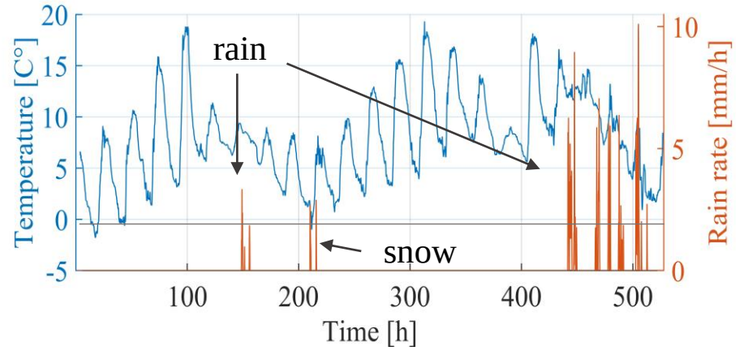
Temporal autocorrelation

$$C(\tau) = \frac{\sum_{t=1}^{N_t} I(t) \cdot I^*(t+\tau)}{\sum_{t=1}^{N_t} |I(t)|^2}$$



Coherence matrix





$$\gamma_{nm} = \left| \frac{\sum_{l=1}^{L} I_{l,n} \cdot I_{l,m}^*}{\sum_{l=1}^{L} |I_{l,n}|^2 \cdot \sum_{l=1}^{L} |I_{l,m}|^2} \right|$$

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