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## Estimating the Vegetation phenology Time of recovery after a critical perturbation from Landsat time series within the frame of a Bayesian Harmonic model

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In Murgia Alta National Park the repeated fire perturb the stability of the environment and it s capacity to be a carbon sink. Thanks to the Landsat archive we can observed change in phenology t over the two decade (2000-2019). Unfortunately the phenological signal extracted from Landsat time series bear several uncertainties caused by missing data and error in atmospheric correction that makes difficult to reconstruct the trajectory of each pixel. Applying a Bayesian Harmonic model we can obtain not only expected values for the vegetation index time series but also confidence interval both for vegetation index and derived statistics. We took the phenological statistical framework of the Ecological Functional Attributes (EFA) to obtain annual statics and evaluate the time of recovery to obtain EFA with no statistical difference from the pre-perturbation time.

The results highlighted that only of subset of burned forest recover EFA values after 10 years of critical events. In particular the values of intra year variability tend to be higher due to the different trajectory of young shoots. The burned grassland time of recovery is much shorter given that the vast majority of pixel recover pre-event EFA in less than 4 year.