SARI: interactive & online time series analysis software

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What is it?	An online tool to analyze time series interactively
How much for using it?	Nothing
Where is it?	At https://alvarosg.shinyapps.io/sari
Who can use it?	Anyone having an Internet connection
What can I do with it?	For instance, you can …

More details can be found in Santamaría-Gómez, A. (2019) **SARI: interactive GNSS position time series analysis software**. GPS Solut. 23: 52. DOI: 10.1007/s10291-019-0846-y

- Fit linear, polynomial, sinusoidal, logarithmic, exponential and step-change models.
- Fit time-variable models using a first-order extended Kalman filter (EKF) or an unscented Kalman filter (UKF). See **Fig. 1**.
- Band-pass filter the series using the Vondrak smoother. See **Fig. 1**.
- Estimate the Lomb periodogram. See **Fig. 2**.
- Estimate the wavelet transform. See **Fig. 3**.
- Estimate the power-law noise content with fixed/free spectral index.
- Fit a non-parametric periodic waveform not having a sinusoidal shape.
- Compare and correct the series with a secondary series from a model (loading, post-seismic, etc.) or from a nearby station.
- Display equipment changes from a IGS-like station log, a GAMIT-like station.info file or a customized offset file (earthquake dates).
- Test the statistical significance of the estimated offsets in the series against colored noise.
- Remove specific periods of data or individual outliers one-by-one or automatically using a threshold.
- Average, reduce and regularize the sampling rate.
- Estimate the linear trend using the discontinuity-free MIDAS algorithm.
- Automatically detect discontinuities (aka offsets, step-changes).
- Upload any unevenly sampled time series in different formats.
- Estimate the histogram of the residuals and assess their stationarity using two different tests.
- Save the analysis results in a self-contained file and apply the same model to a different series.
- And many more awesome things … or if they are not implemented you can suggest them to me!

Examples

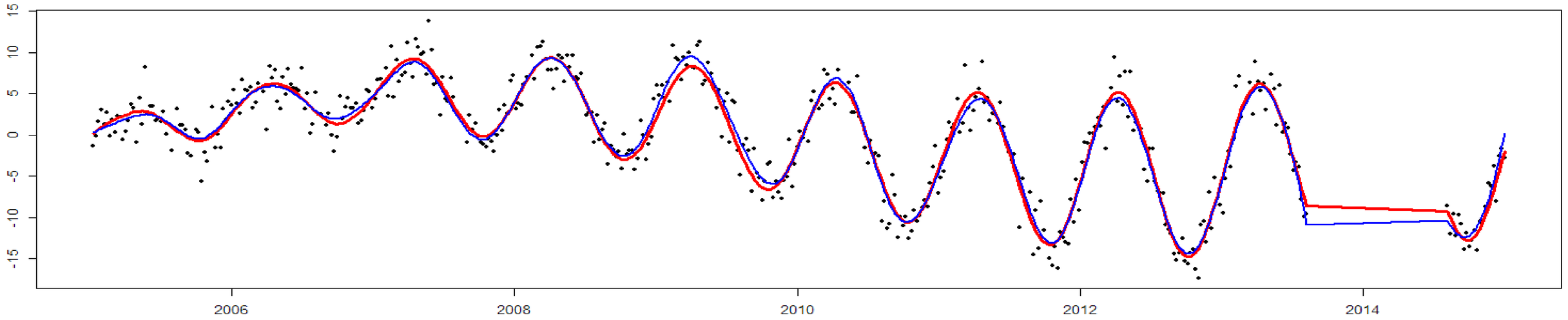

Fig. 1. Synthetic series with an annual cycle of varying amplitude superimposed on a sinusoid-like varying trend and noise (black dots) fitted with a UKF (red line) and the Vondrák smoother (blue line). Units are whatever you want they to be.

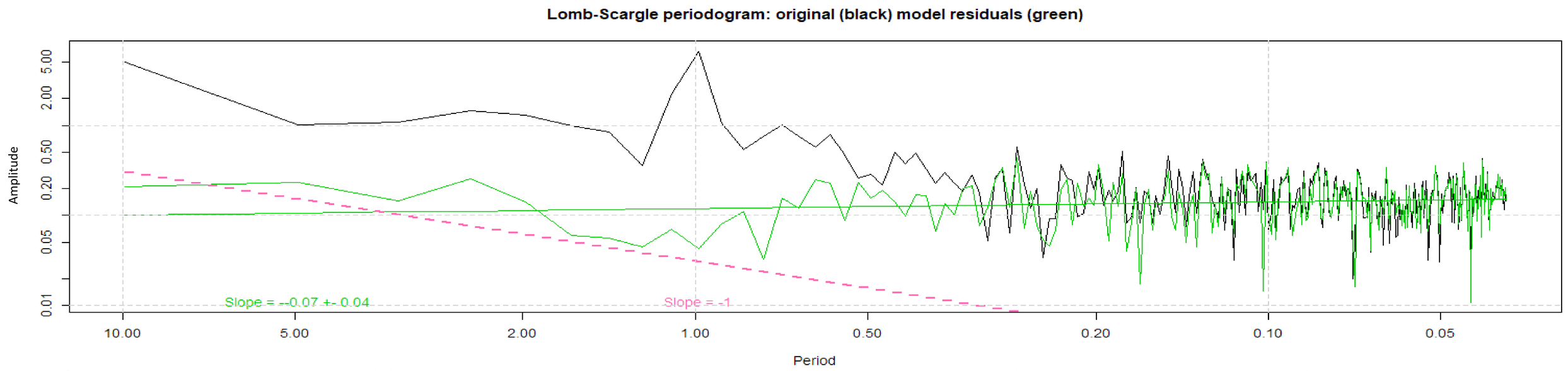

Fig. 2. Lomb periodograms of the original series in Fig. 1 (black) and of the residuals of the UKF model fit in Fig. 1 (green). The slope of the residuals periodogram (green) and that corresponding to the flicker noise (dashed pink) are also shown. Units are the same as in Fig. 1.

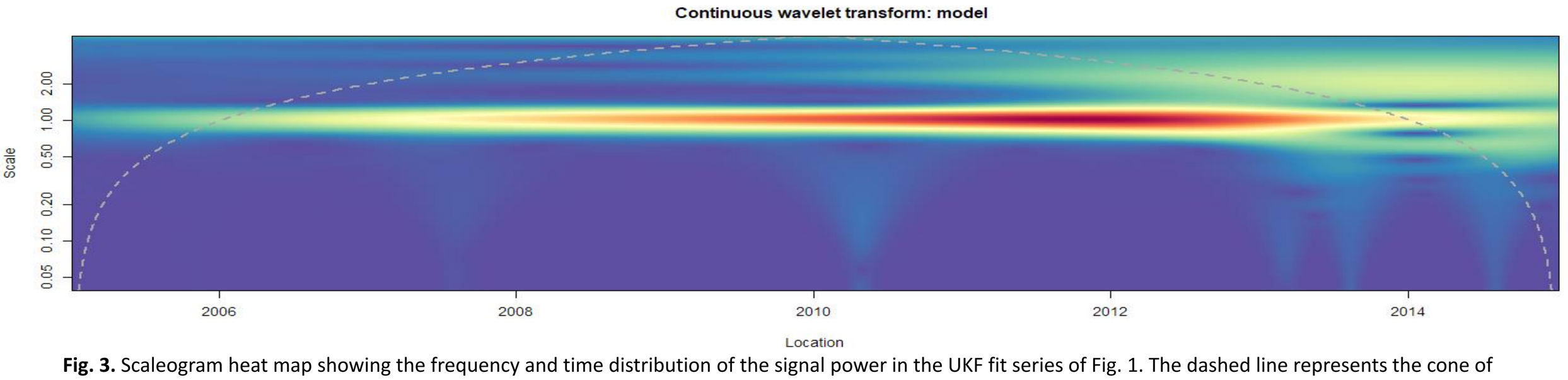

Fig. 3. Scaleogram heat map showing the frequency and time distribution of the signal power in the UKF fit series of Fig. 1. The dashed line represents the cone of influence of the wavelet transform. Scale units are cycles-per-time-unit in Fig. 1.