## Detection of the windows for model inversion

Given a time series of fAPAR defined over the decadal time interval [0, .., d]

**1.** Compute the autocorrelation or Lomb Scargle to determine the relevant frequencies. One growing season: 1 frequency of period 36 decades. Two growing season: two major frequencies (period 36, and 18), or three major frequencies if the second one is not 18 (period 36, period T, period 36-T).

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| For example consider the following cycles:  One season, T=36  Two seasons: T=36, 11, 36-11. NOTE THAT HERE AUTOCORR DOES NOT WORK WELL!! |

**2.** Compute the average year on the data series starting form the first available decade

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| We may get something like this (one season)  Or like this (two seasons) |

**3.** locate the overall maximum

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| Position of the overall max = Xmax = 35 |

*If there is one growing season:*

**4(1).** locate the minimum (or average position of fapar below a threshold/pecentile)

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| Position of the overall min Xmin= 17 |

**5(1)**. The model optimization window is [i\*36+ Xmin, (i+1)\*36+ Xmin], where i is the progressive number of years to be investigated (i=[0, ..])

*If there are two growing seasons:*

**4(2).** now we know that we can have a second max at Xmax +11 or Xmax -11, check which of the two is the second maximum

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| Position of the second max = Xmax2 = 9 |

**5(2).** locate the two minima between the two maxima

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| Position of the first min (between 35 and 9) Xmin1 = 5 and second one (between 9 and 35) Xmin2= 20 |

**6(2).** The series starts at 5, with a first window [i\*36+ Xmin1, i\*36+ Xmin2], and a second window [i\*36+ Xmin2, (i+1)\*36+ Xmin1]