# Supplementary Materials: A Simple Harmonic Model for FAPAR Temporal Dynamics in the Wetlands of the Volga-Akhtuba Floodplain. *Remote Sensing* 2016, *8*, 762

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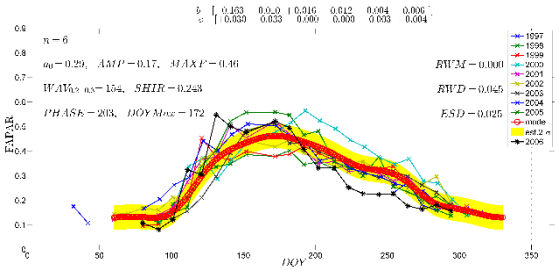
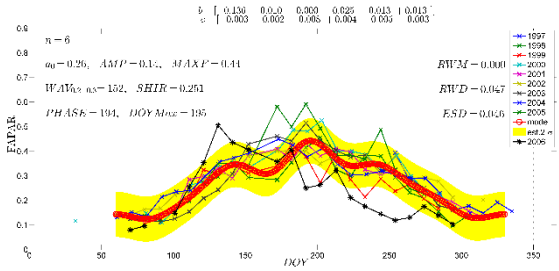
## 1. FAPAR temporal dynamics model and reference data plots for all 15 test sites

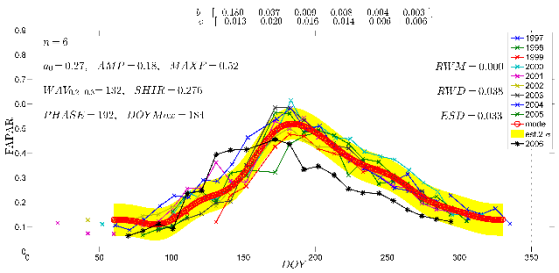
The following charts (see figures below) depict comparisons between the derived model and actual FAPAR data for all 15 test sites.



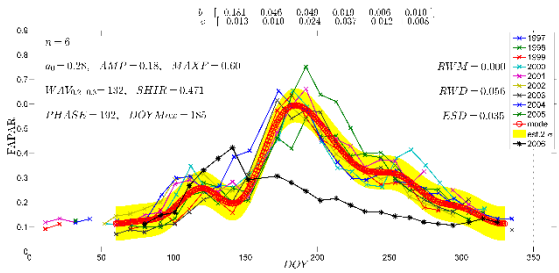
(**a**) Pahotniy runnel: woodlands and abandoned agricultural lands



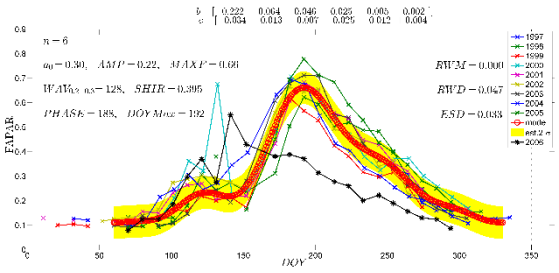
(**b**) Zamora dried lake: woodlands and secondary feather grass-sagebrush steppe



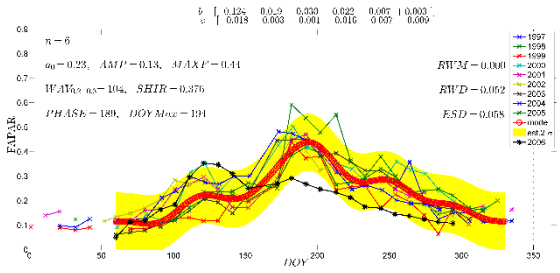
(**c**) Chichera lake: steppe and cereal meadows



(**d**) Kaloshi lake: cereal meadows

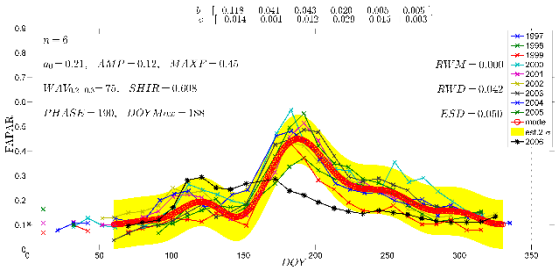


(**e**) Tarpan runnel: herb and cereal meadows

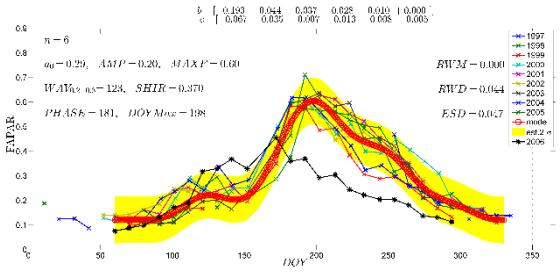


(**f**) Osochniy runnel: cereal and *Glycyrrhiza glabra* meadows

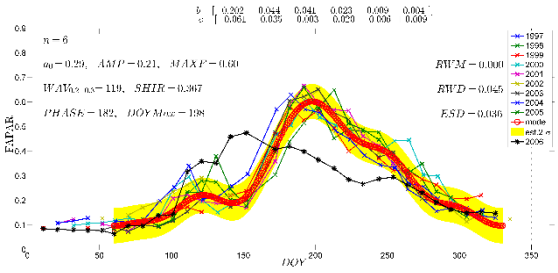
**Figure S1.** Model curves of the fraction of absorbed photosynthetically-active radiation (FAPAR) temporal dynamics along with theoretically-estimated two-sigma corridors and numerical results, including model-derived indices, compared to actual data for land sites with different types of plant cover, with the anomalous 2006 given using distinct markers and color, for test sites #1—6: (**a**) site #1; (**b**) site #2; (**c**) site #3; (**d**) site #4; (**e**) site #5; (**f**) site #6.



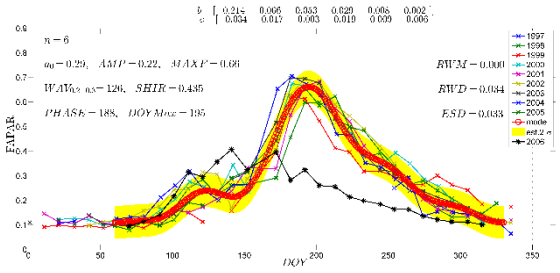
(**a**) Karasyachiy Ilmen: cereal and steppe meadows



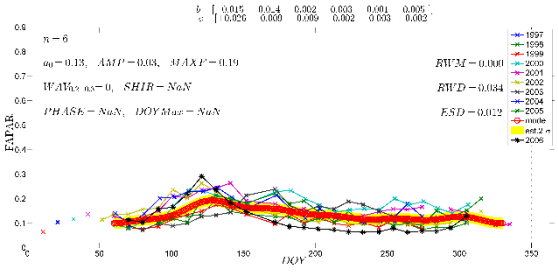
(**b**) Maiorskoe lake: herb and cereal meadows



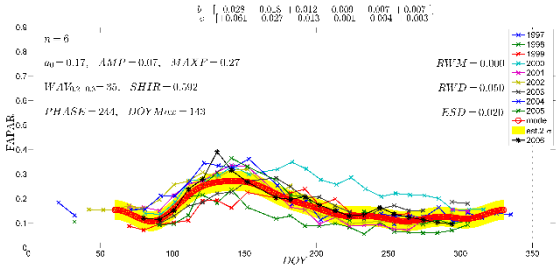
(**c**) Akhtuba-Kriusha: herb and cereal meadows



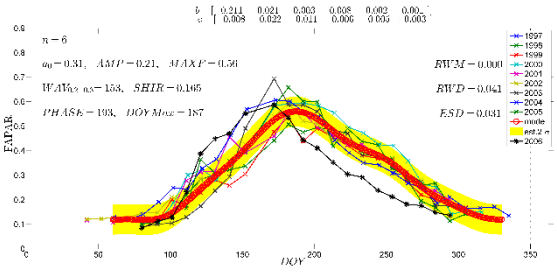
(**d**) Sukhaya Akhtuba: herb and cereal meadows



(**e**) Bolkhuny: desert

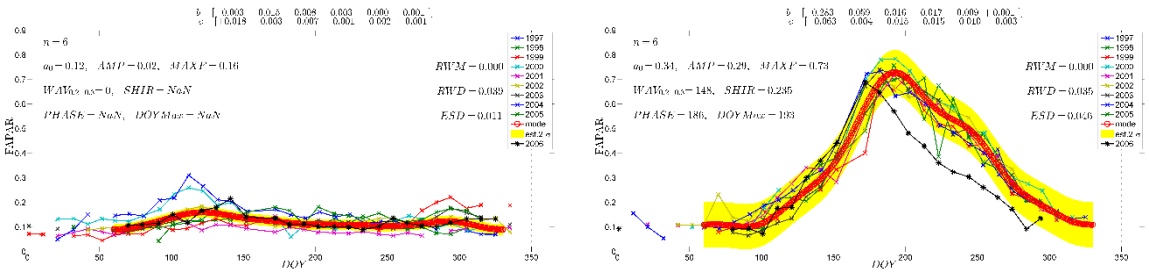


(**f**) Leninsk: dry steppe



(**g**) Sukhodol: woodlands and abandoned agricultural lands

**Figure S2.** Model curves of the fraction of absorbed photosynthetically-active radiation (FAPAR) temporal dynamics along with theoretically-estimated two-sigma corridors and numerical results, including model-derived indices, compared to actual data for land sites with different types of plant cover, with the anomalous 2006 given using distinct markers and color, for test sites #7—13: (**a**) site #7; (**b**) site #8; (**c**) site #9; (**d**) site #10; (**e**) site #11; (**f**) site #12; (**g**) site #13.



(**a**) Seroglazovo: desert (**b**) Proran runnel: marshes

**Figure S3.** Model curves of the fraction of absorbed photosynthetically-active radiation (FAPAR) temporal dynamics along with theoretically-estimated two-sigma corridors and numerical results, including model-derived indices, compared to actual data for land sites with different types of plant cover, with the anomalous 2006 given using distinct markers and color, for test sites #14, 15: (**a**) site #14; (**b**) site #15.

## 2. Numerical Results in A Single Table

All numerical results are also given in Table S1. The harmonic coefficients $\boldsymbol{b}_j$ and $\boldsymbol{c}_j$, which have significant magnitude are marked with bold font style, and all coefficients that fall far below the accuracy of FAPAR assessment, namely below 0.01, are in regular font.

**Table S1.** Numerical results in a single table.

| Site #/Name | $a_0$ | *AMP* | *MAXF* | *SHIR* | *RWD* | $b_j$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $WAV_{0.2-0.3}$ | *PHASE* | *DOYMax* | | *ESD* | $c_j$ | | | | | |
| 01/Pahotniy | 0.29 | 0.17 | 0.46 | 0.243 | 0.045 | **−0.163** | **−0.01** | **0.016** | **0.012** | −0.004 | −0.006 |
| | 154 | 203 | 172 | | 0.025 | **0.03** | **−0.033** | 0 | 0 | 0.003 | 0.004 |
| 02/Zamora | 0.26 | 0.14 | 0.44 | 0.251 | 0.047 | **−0.136** | **−0.01** | 0 | **0.025** | **−0.013** | **0.013** |
| | 152 | 194 | 195 | | 0.046 | −0.003 | 0.002 | −0.008 | 0.004 | 0.005 | −0.003 |
| 03/Chichera | 0.27 | 0.18 | 0.52 | 0.276 | 0.038 | **−0.18** | **0.037** | −0.009 | 0.008 | 0.004 | −0.003 |
| | 132 | 192 | 184 | | 0.033 | **−0.013** | **−0.02** | **0.016** | **−0.014** | 0.006 | 0.006 |
| 04/Kaloshi | 0.28 | 0.18 | 0.6 | 0.471 | 0.056 | **−0.181** | **0.046** | **−0.049** | **0.019** | 0.006 | **−0.01** |
| | 132 | 192 | 185 | | 0.035 | **−0.013** | **−0.01** | **0.024** | **−0.037** | **0.012** | 0.008 |
| 05/Tarpan | 0.3 | 0.22 | 0.66 | 0.395 | 0.047 | **−0.222** | **0.064** | **−0.046** | **0.025** | −0.005 | −0.002 |
| | 128 | 188 | 192 | | 0.033 | **−0.034** | **0.013** | 0.007 | **−0.025** | **0.012** | 0.004 |
| 06/Osochniy | 0.23 | 0.13 | 0.44 | 0.376 | 0.052 | **−0.124** | **0.019** | **−0.03** | **0.022** | −0.007 | 0.003 |
| | 104 | 189 | 194 | | 0.058 | **−0.018** | −0.003 | 0.001 | **−0.016** | 0.007 | 0.009 |
| 07/Karasyachiy | 0.21 | 0.12 | 0.45 | 0.608 | 0.042 | **−0.118** | **0.041** | **−0.043** | **0.02** | −0.005 | −0.005 |
| | 75 | 190 | 188 | | 0.05 | **−0.014** | 0.001 | **0.012** | **−0.029** | **0.015** | 0.003 |
| 08/Maiorskoe | 0.29 | 0.2 | 0.6 | 0.37 | 0.044 | **−0.193** | **0.044** | **−0.037** | **0.028** | **−0.01** | 0 |
| | 123 | 181 | 198 | | 0.047 | **−0.067** | **0.035** | −0.007 | **−0.013** | 0.008 | 0.005 |
| 09/Kriusha-Akhtuba | 0.29 | 0.21 | 0.6 | 0.367 | 0.045 | **−0.202** | **0.044** | **−0.041** | **0.023** | −0.009 | −0.004 |
| | 119 | 182 | 198 | | 0.036 | **−0.061** | **0.035** | −0.003 | **−0.02** | 0.006 | 0.009 |
| 10/Sukhaya Akhtuba | 0.29 | 0.22 | 0.66 | 0.435 | 0.034 | **−0.214** | **0.066** | **−0.053** | **0.029** | −0.008 | −0.002 |
| | 126 | 188 | 195 | | 0.033 | **−0.034** | **0.017** | −0.003 | **−0.019** | 0.009 | 0.006 |
| 11/Bolkhuny | 0.13 | 0.03 | 0.19 | | 0.034 | **−0.015** | **−0.014** | −0.002 | 0.003 | −0.001 | −0.005 |
| | 0 | | | | 0.012 | **0.026** | −0.009 | −0.009 | −0.002 | 0.003 | 0.002 |
| 12/Leninsk | 0.17 | 0.07 | 0.27 | 0.592 | 0.05 | **−0.028** | **−0.018** | **0.012** | 0.009 | 0.007 | 0.007 |
| | 35 | 244 | 143 | | 0.02 | **0.061** | **−0.027** | **−0.013** | −0.001 | 0.004 | 0.003 |
| 13/Sukhodol | 0.31 | 0.21 | 0.56 | 0.165 | 0.041 | **−0.211** | **0.021** | −0.003 | 0.008 | −0.002 | −0.001 |
| | 153 | 193 | 187 | | 0.031 | −0.008 | **−0.022** | **0.011** | −0.006 | 0.005 | 0.003 |
| 14/Seroglazovo | 0.12 | 0.02 | 0.16 | | 0.039 | −0.003 | **−0.015** | −0.008 | −0.003 | 0 | −0.001 |
| | 0 | | | | 0.011 | **0.018** | −0.003 | −0.007 | −0.001 | 0.002 | 0.001 |
| 15/Proran | 0.34 | 0.29 | 0.73 | 0.235 | 0.035 | **−0.283** | **0.059** | **−0.016** | **0.017** | −0.009 | 0.001 |
| | 148 | 186 | 193 | | 0.046 | **−0.063** | 0.004 | **0.015** | **−0.015** | **0.01** | 0.003 |