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| Number | POINT_ LATITUDE | POINT_ LONGITUDE | POINT_ ELEVATION | POINT_WINTER_ BALANCE | POINT_SUMMER_ BALANCE | POINT_ANNUAL_ BALANCE |
|---|---|---|---|---|---|---|
| | EEE6 | EEE7 | EEE8 | EEE9 | EEE10 | EEE11 |
| 1 | | | 100 | | | 100 |
| 2 | | | 398 | | | 500 |
| … | … | … | … | … | … | … |
| 71 | | | 1073 | | | -63 |
| 72 | -54.78136 | -68.40169 | 1038 | 1015 | -644 | 371 |
| 73 | -54.78182 | -68.40249 | 1036 | 947 | -540 | 406 |
| … | … | … | … | … | … | … |
| 101 | -54.78048 | -68.40171 | 1073 | 743 | -984 | -241 |
| 102 | -16.3032 | -68.108 | 5053 | | | -958 |
| 103 | -16.3025 | -68.1083 | 5056 | | | -1385 |
| … | … | … | … | … | … | … |
| 620 | | | 4058 | | | 120 |
| 621 | | | 3796 | 20 | -3719 | -3699 |
| 622 | | | 3828 | 99 | -2565 | -2466 |
| … | … | … | … | … | … | … |
| 2526 | 60.40417 | -148.9067 | 1053 | | | -2090 |
| 2527 | 60.41974 | -148.9207 | 1283 | | | 0 |
| 2528 | 60.42495 | -148.9371 | 1367 | | | 960 |

**Table 1:** Matrix of basic data for statistical modelling.

| Influencing factors *x* | Dependent factors (indicators*y*) | | | | | |
|---|---|---|---|---|---|---|
| | EEE6 | EEE7 | EEE8 | EEE9 | EEE10 | EEE11 |
| EEE6 - POINT LATITUDE *[decimal degree]* | 1623 | 1623 | 1623 | 388 | 388 | 1591 |
| EEE7 - POINT LONGITUDE *[decimal degree]* | 1623 | 1623 | 1623 | 388 | 388 | 1591 |
| EEE8 - POINT ELEVATION *[m a.s.l.]* | 1623 | 1623 | 2467 | 531 | 531 | 2467 |
| EEE9 - POINT WINTER BALANCE *[mm w.e.]* | 388 | 388 | 531 | 531 | 531 | 531 |
| EEE10 - POINT SUMMER BALANCE *[mm w.e.]* | 388 | 388 | 531 | 531 | 531 | 531 |
| EEE11 - POINT ANNUAL BALANCE *[mm w.e.]* | 1591 | 1591 | 2467 | 531 | 531 | 2467 |

**Table 2:** Quantity of the measured points of balance of mass of glaciers, piece.

| Influencing factors *x* | Dependent factors Indicators *y* | | | | | | Sum | Place |
|---|---|---|---|---|---|---|---|---|
| | EEE6 | EEE7 | EEE8 | EEE9 | EEE10 | EEE11 | $\Sigma r$ | $I_x$ |
| EEE6 | 1 | 0.9732 | 0.9491 | 0.4425 | 0.3985 | 0.4551 | 4.2184 | 2 |
| EEE7 | 0.9688 | 1 | 0.4305 | 0.4154 | 0.4629 | 0.4156 | 3.6932 | 3 |
| EEE8 | 0.8178 | 0.8611 | 1 | 0.7201 | 0.6835 | 0.4421 | 4.5246 | 1 |
| EEE9 | 0.2237 | 0.4492 | 0.5431 | 1 | 0.2265 | 0.4721 | 2.9146 | 6 |
| EEE10 | 0.6408 | 0.5571 | 0.1557 | 0.2301 | 1 | 0.7309 | 3.3146 | 5 |
| EEE11 | 0.3703 | 0.4978 | 0.1719 | 0.5363 | 0.7592 | 1 | 3.3355 | 4 |
| Sum $\Sigma r$ | 4.0214 | 4.3384 | 3.2503 | 3.3444 | 3.5306 | 3.5158 | 22.0009 | - |
| Place $I_y$ | 2 | 1 | 6 | 5 | 3 | 4 | - | 0.6111 |

**Table 3:** Correlation matrix and rating of factors on the binary relations.

other. Perhaps also comparison of all glaciers with other objects sew planets, for example, with deserts or with agroecological classes of a soil cover.

From six influencing variables on the first place there was EEE8 factor. On the second place EEE6 factor, and was located on the third place – EEE7. Among dependent indicators on the first place there is EEE7 factor. In second place is the factor EEE6, and the third -EEE10.

## Strong Binary Relations

At correlation coefficient more than 0.7 binary relations between factors become strong (tab. 4As a rule, the accounting of wave indignation, additional to a trend, gives significant increase in adequacy to the revealed regularity on a formula (1). But glaciers do not yet have good data, because many of the values of the six factors have empty cells: the best matrix is illustrated in Table 4 completely filled with cells.

Because of low completeness of a matrix from 30 formulas received only eight strong communications that makes 22.2%. Thus as the influencing variable EEE9 factor -POINT WINTER BALANCE was excluded. But as dependent indicators remained all six factors. From eight strong communications three (37.50%) treat trends.

Hierarchy of strong communications following (Table 5): 1) 0.9732 – EEE7=f(EEE6); 2) 0.9688 – EEE6=f(EEE7); 3) 0.9491 – EEE8=f(EEE6); 4) 0.8611 – EEE7=f(EEE8); 5) 0.8178 – EEE6=f(EEE8); 6) 0.7592 – EEE10=f(EEE11); 7) 0.7309 – EEE11=f(EEE10); 8) 0.7201 – EEE9=f(EEE8).

In Table 5 parameters of statistical models on the general formula

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(1) which values are written down in a compact matrix form with significant Figures 1-7 are given

From data of Table 5 it is visible that some regularities required replacement of variables because of negative values of the influencing variables.

From schedules in Figure 1 it is visible that the function EEE7=f(EEE6) supports three members from whom the first two are a difference of two laws: first, law of exponential growth; secondly, indicative law. The third component is wavelet on a formula (1) with very high coefficient of correlation 0.9362. Therefore the main contribution to formation of the binary relation is carried out by wave function with a variable amplitude under the law of exponential death and the variable period of fluctuation. Thus the initial stage of fluctuation is equal 2×4.87479 ≈ 9.75 degrees. In process of increase in width fluctuation calms down because of growth of a half-cycle.

Remains EEE7 after three members of model have significant values at the latitudes of 40-65 degrees. Therefore if it is necessary, the wavelet analysis of microwaves on the remains for this width is possible further. The EEE8 function=f(EEE6) it consists of only the binomial trend. According to Table 5 it contains the sum from two laws: first, law of exponential death; secondly, biotechnical law [2-5]. The remains show small fluctuation which can be identified a formula (1), however adequacy of a wave component will be very small.

Other schedules have similar explanations. Therefore glaciers, as well as other types of natural objects [5], have natural distributions.

The maximum number of members of the statistical model EEE6=f(EEE7) is equal to four that corresponds to computing opportunities of the program CurveExpert-1.40 environment.

| Influencing factors *x* | Dependent factors indicators *y* ) | | | | | |
|---|---|---|---|---|---|---|
| | **EEE6** | **EEE7** | **EEE8** | **EEE9** | **EEE10** | **EEE11** |
| EEE6 - POINT LATITUDE | | **0.9732** | **0.9491** | | | |
| EEE7 - POINT LONGITUDE | **0.9688** | | | | | |
| EEE8 - POINT ELEVATION | **0.8178** | **0.8611** | | **0.7201** | | |
| EEE10 - POINT SUMMER BALANCE | | | | | | **0.7309** |
| EEE11 - POINT ANNUAL BALANCE | | | | | **0.7592** | |

**Table 4:** Correlation matrix of the strong binary relations at r>0.7.

| Indi- cators *y* | Asymmetric wavelet $y_i = a_{1i} x^{a_{2i}} \exp(-a_{3i} x^{a_{4i}}) \cos(\pi x / (a_{5i} + a_{6i} x^{a_{7i}}) - a_{8i})$ | | | | | | | | Correl. coeffic. *r* |
|---|---|---|---|---|---|---|---|---|---|
| | Amplitude (half) of fluctuation | | | | Fluctuation half-cycle | | | Shift | |
| | *a*1*i* | *a*2*i* | *a*3*i* | *a*4*i* | *a*5*i* | *a*6*i* | *a*7*i* | *a*8*i* | |
| The influence EEE6 *[decimal degree]* | | | | | | | | | |
| EEE71 Figure 1 | 4.23078 | 0 | -0.16452 | 0.54045 | 0 | 0 | 0 | 0 | 0.9732 |
| | -0.31020 | 1.48076 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | 132.72384 | 0 | 8.79872e-5 | 1.76602 | 4.87479 | 0.29176 | 0.56033 | 0.24849 | |
| EEE81 Figure 1 | 1.66509e6 | 0 | 0.31234 | 0.94742 | 0 | 0 | 0 | 0 | 0.9491 |
| | 7.82146e-5 | 4.91282 | 0.018337 | 1.20027 | 0 | 0 | 0 | 0 | |
| The influence EEE7 *[decimal degree]* | | | | | | | | | |
| EEE62 Figure 2 | 64.56655 | 0 | 0.00076040 | 1.01838 | 0 | 0 | 0 | 0 | 0.9688 |
| | -1.24710e-15 | 6.59346 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | -2.35962e-7 | 5.20107 | 0.042456 | 1 | 12.92183 | 0.0036148 | 1.03167 | 2.65582 | |
| | -0.00052866 | 3.02216 | 0.025670 | 1 | 3.80507 | 9.27492e-5 | 1 | 4.71131 | |
| The influence EEE8 *[m a.s.l.]* | | | | | | | | | |
| EEE7 Figure 3 | -87.70507 | 0 | -8.09363e-5 | 1.07588 | 0 | 0 | 0 | 0 | 0.8611 |
| | 2.50470e-6 | 2.55776 | 0.00026769 | 1.12617 | 0 | 0 | 0 | 0 | |
| | -9.59526e-8 | 3.19687 | 0.0017158 | 0.99993 | 157.16690 | 0.28654 | 0.88567 | 6.01043 | |
| EEE6 Figure 4 | 7.25053 | 0 | -0.00032396 | 1.09546 | 0 | 0 | 0 | 0 | 0.8178 |
| | -6.85611e-17 | 5.03862 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | -0.00012515 | 2.24860 | 0.0020534 | 1 | 2922.5439 | -0.48413 | 0.99988 | -2.92162 | |
| EEE9 Figure 5 | 59.61396 | 0 | -0.14457 | 0.46269 | 0 | 0 | 0 | 0 | 0.7201 |
| | -2.90947e-7 | 3.11597 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | -0.00062264 | 2.34099 | 0.0018640 | 1.00057 | 846.23612 | -0.042840 | 0.99814 | -0.80809 | |
| The influence EEE11 *[mm w.e.]* | | | | | | | | | |
| EEE103 Figure 6 | -28940.548 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7592 |
| | 270.01817 | 0.52442 | 2.61663e-5 | 0.99761 | 0 | 0 | 0 | 0 | |
| The influence EEE10 *[mm w.e.]* | | | | | | | | | |
| EEE113 Figure 7 | -11303.0999 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7308 |

**Table 5:** Parameters of the strong binary relations at correlation coefficient *r*≥0.7.

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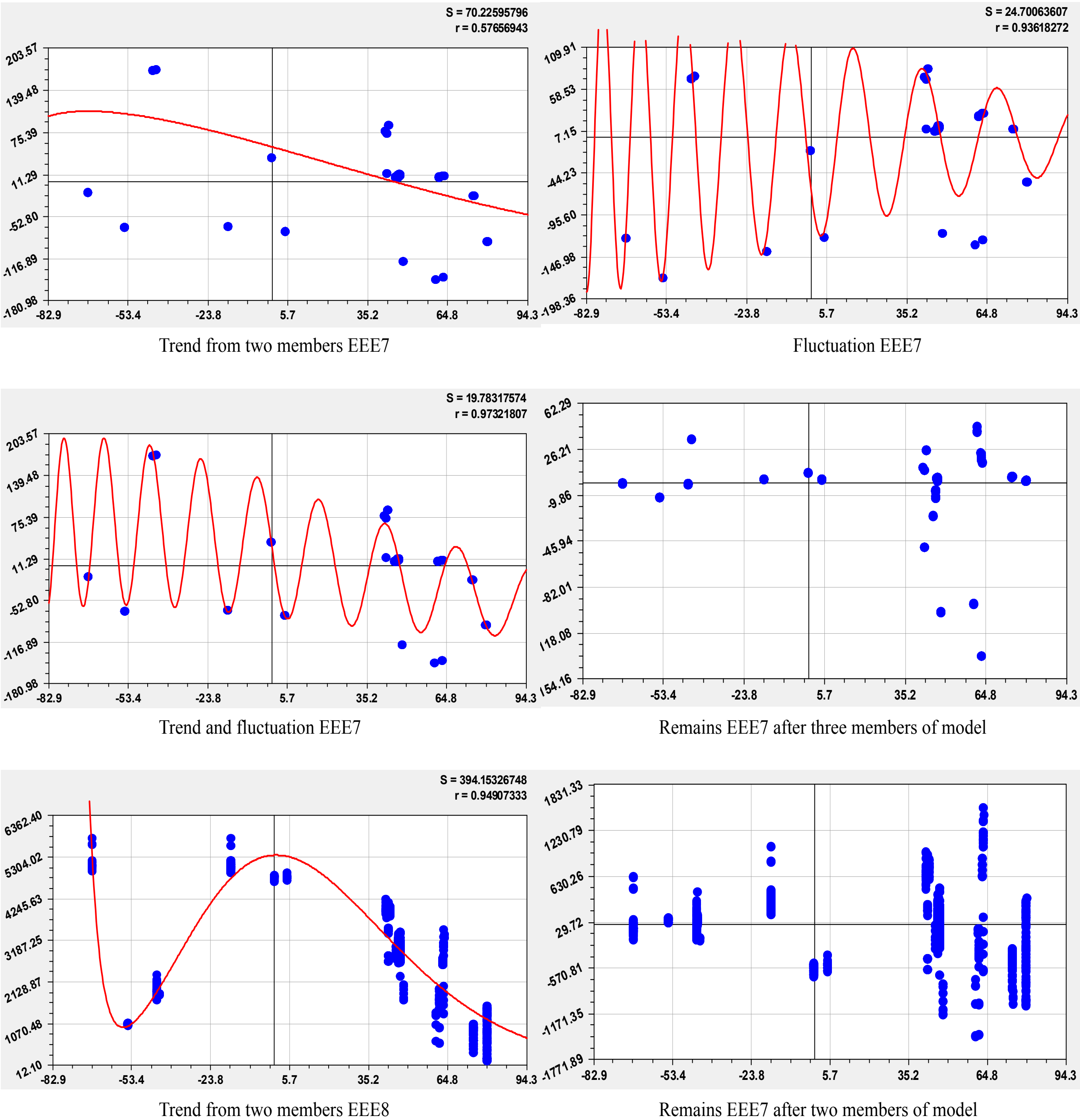


**Figure 1:** Schedules of models of influence of a factor of EEE6 on change of factors of EEE7 and EEE8.

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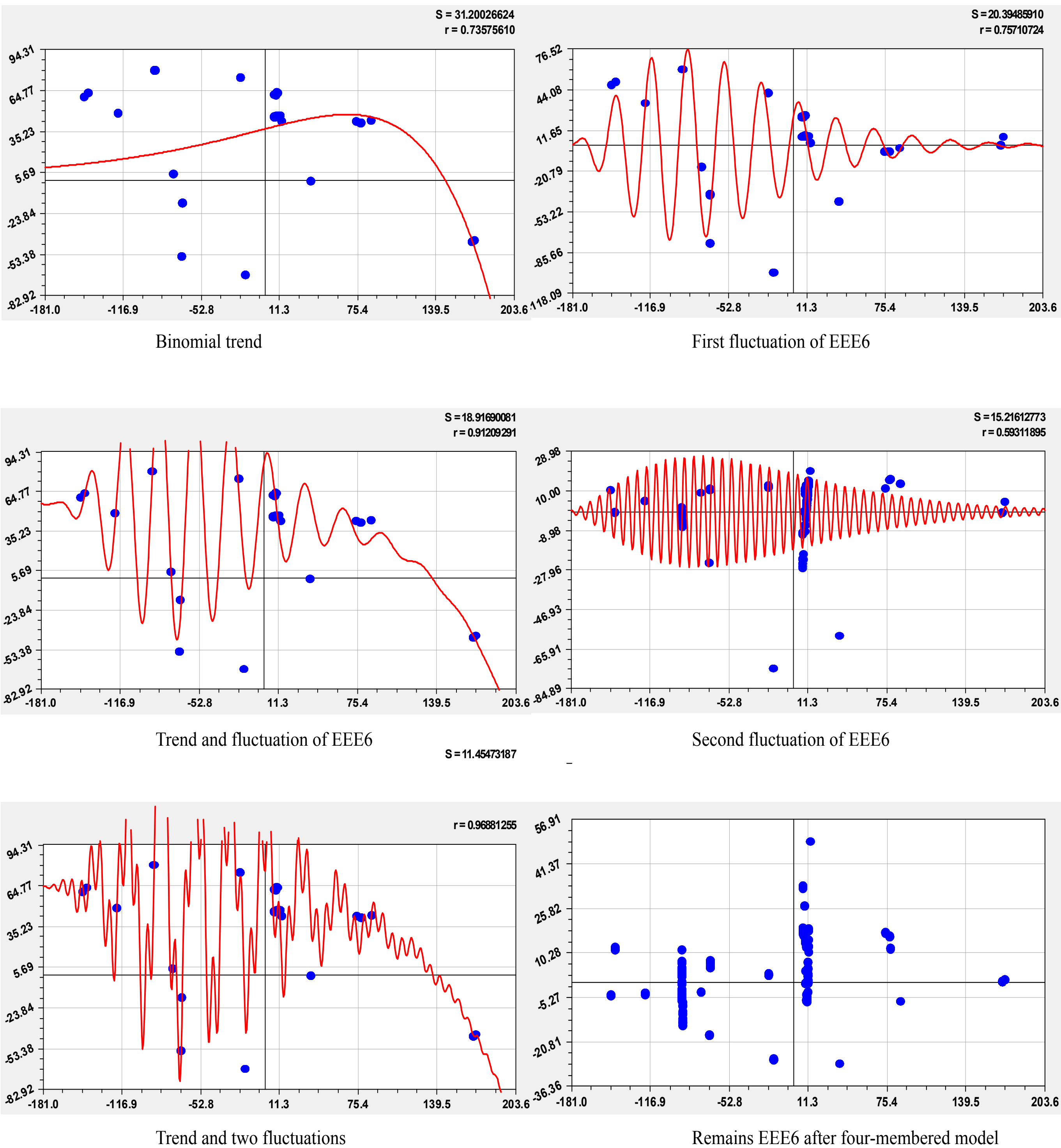


Binomial trend

First fluctuation of EEE6

Trend and fluctuation of EEE6

Second fluctuation of EEE6

Trend and two fluctuations

Remains EEE6 after four-membered model

**Figure 2**. Schedules of models of influence of EEE7 on change of EEE6.

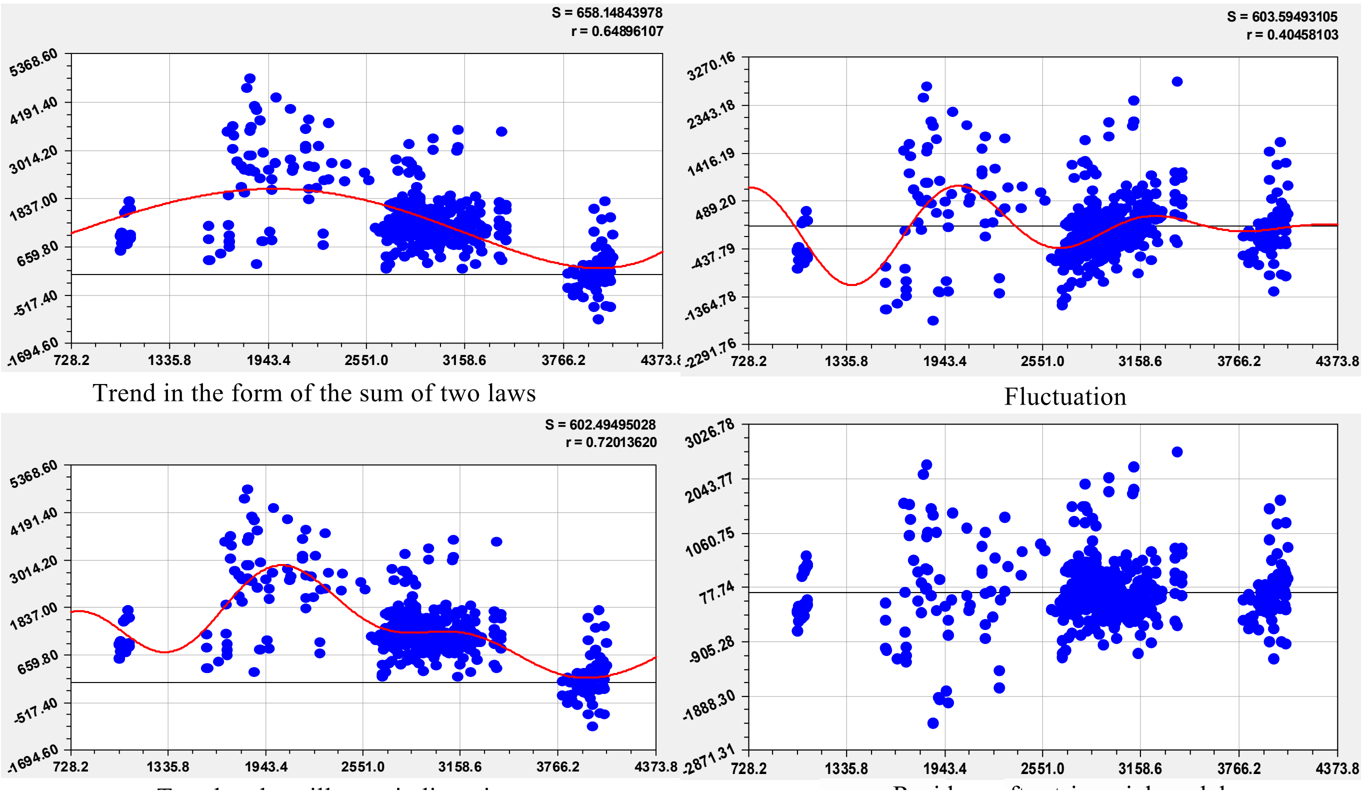


**Figure 3**. Schedules of models of influence of EEE8 on change of EEE7.

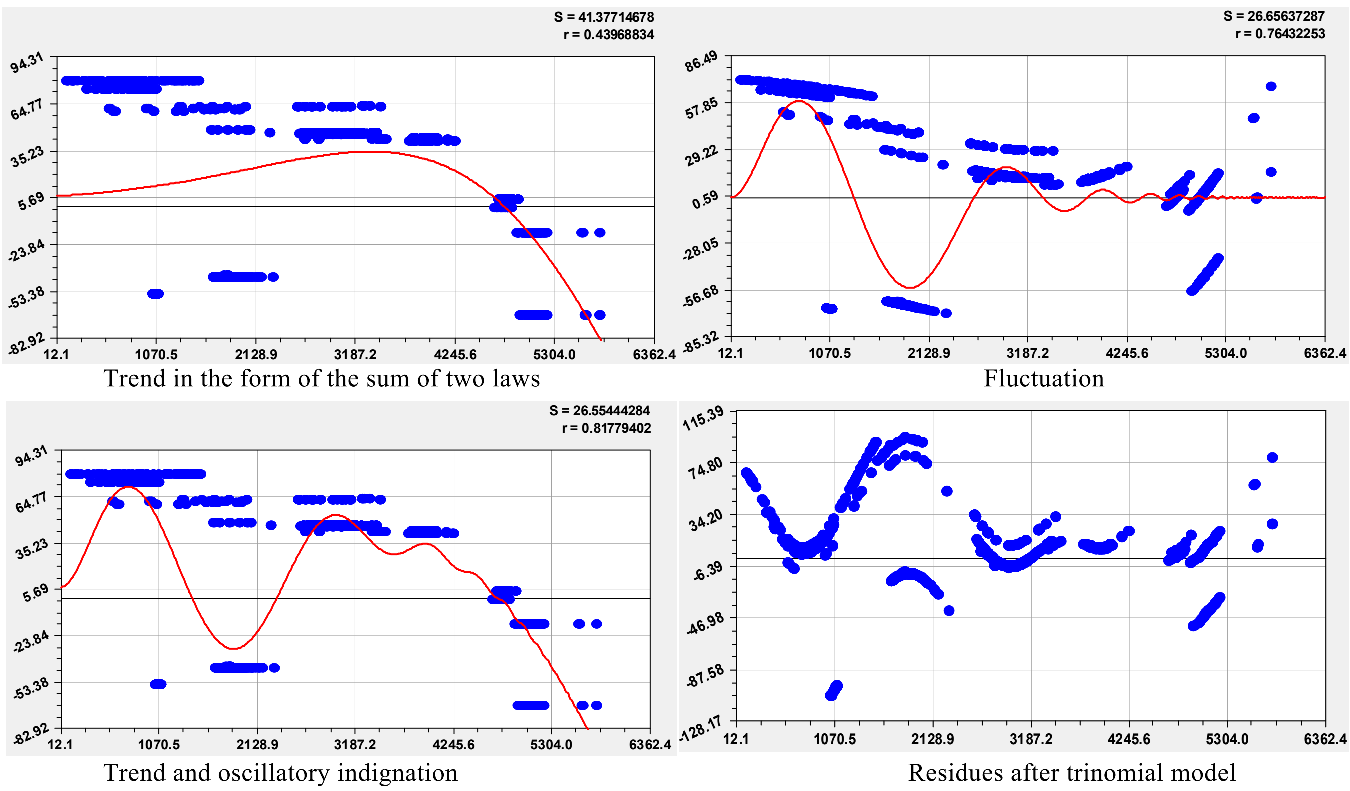


**Figure 4**. Schedules of models of influence of EEE8 on change of EEE6.

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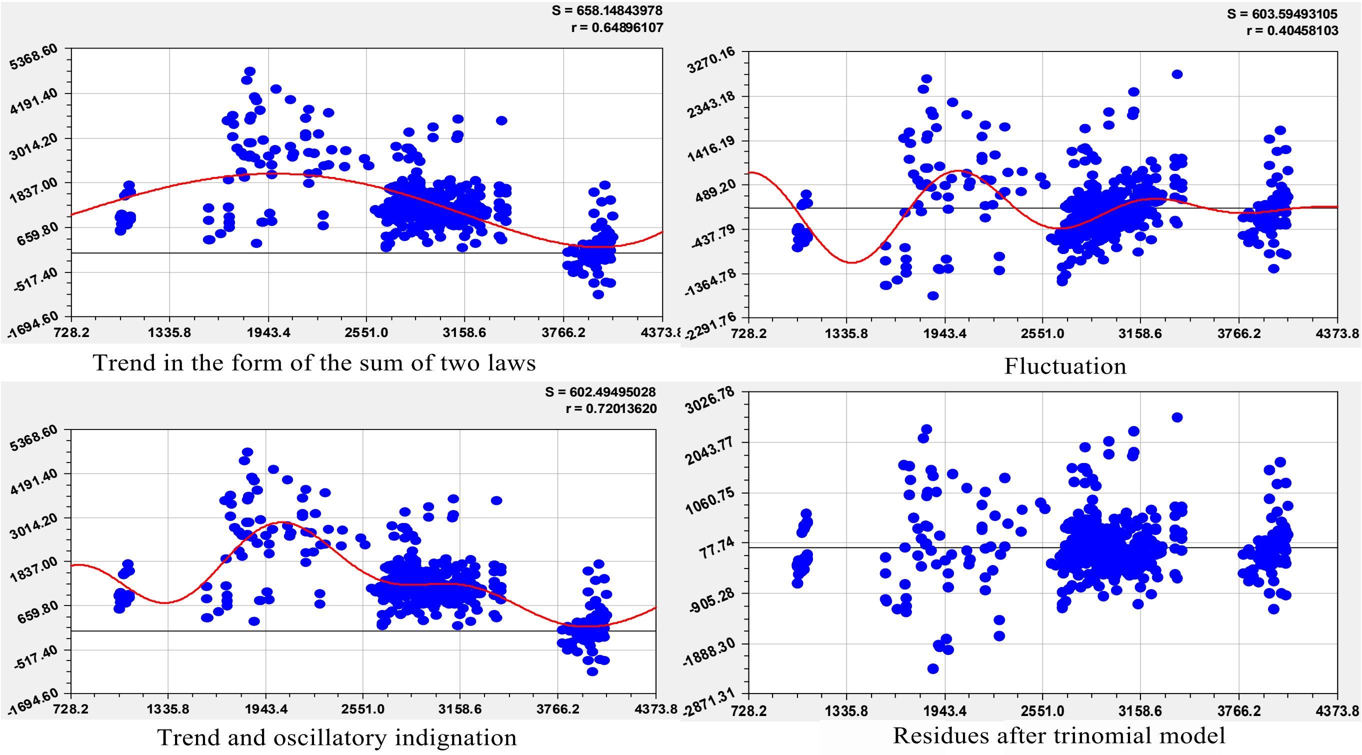


**Figure 5**. Schedules of models of influence of EEE8 on change of EEE9.

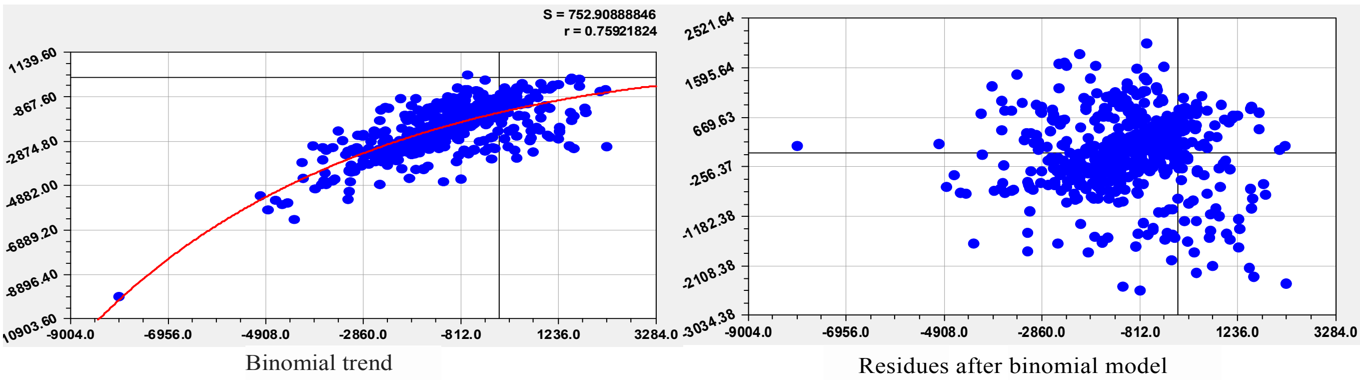


**Figure 6**. Schedules of models of influence of EEE11 on change of EEE10.

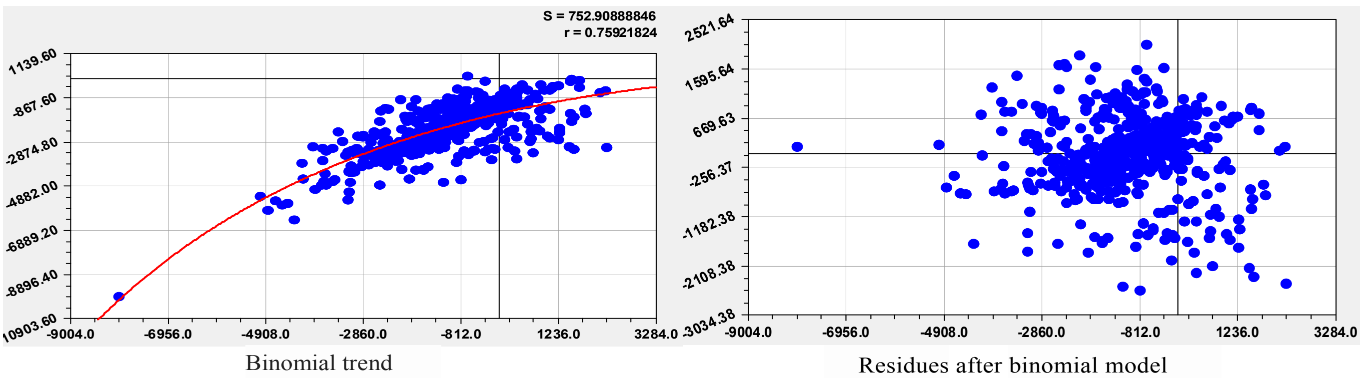


**Figure 7**. Schedules of models of influence of EEE10 on change of EEE11

For the full wavelet analysis it is necessary to develop the special program environment according to our scenarios of statistical modeling for a supercomputer of a petaflop class. Thus the new program environment for large volumes of the Table of basic data will be universal for science.

The analysis of schedules according to amplitude-frequency characteristics shows that the system of glaciers possesses a certain property of wave adaptation to living conditions on the planet Earth.

For some binary relations the number of members in the general statistical model can exceed 100-120 pieces. In this case there is a possibility of carrying out the fractal analysis for group of wavelets on mega, macro, meso and to micro fluctuations.

## Conclusion

Applicability of statistical model (1) to parameters of points of fluctuations of balance at the mass of glaciers of Earth is proved. As a result each binary relation contains a trend and wavelet signals. And the trend is a special case of fluctuation of a wavelet, superlong on the period. As a result the general statistical model represents the plait consisting of a set of lonely waves with variables amplitude and the period of fluctuations. After statistical modeling the factorial analysis allowing making ratings of factors as the influencing parameters and as dependent indicators is carried out.

The offered methodology of identification allows allocating waves of the binary relations between the measured factors at glaciers. Thus for 2528 glaciers of subgroup of EEE finite-dimensional wavelets which can be compared further with heuristic representations of experts are characteristic. The method of identification allows to allocate significant parameters of glaciers and the binary relations between them in which it will be necessary to increase the accuracy of future measurements. Thus from different subgroups we allocated 26 factors, but their joint analysis is disturbed by a disagreement between Tables of data.

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