

Probabilistic seismic hazard for NCU considering the impact from the Seismogenic structures and seismicity in the vicinity.

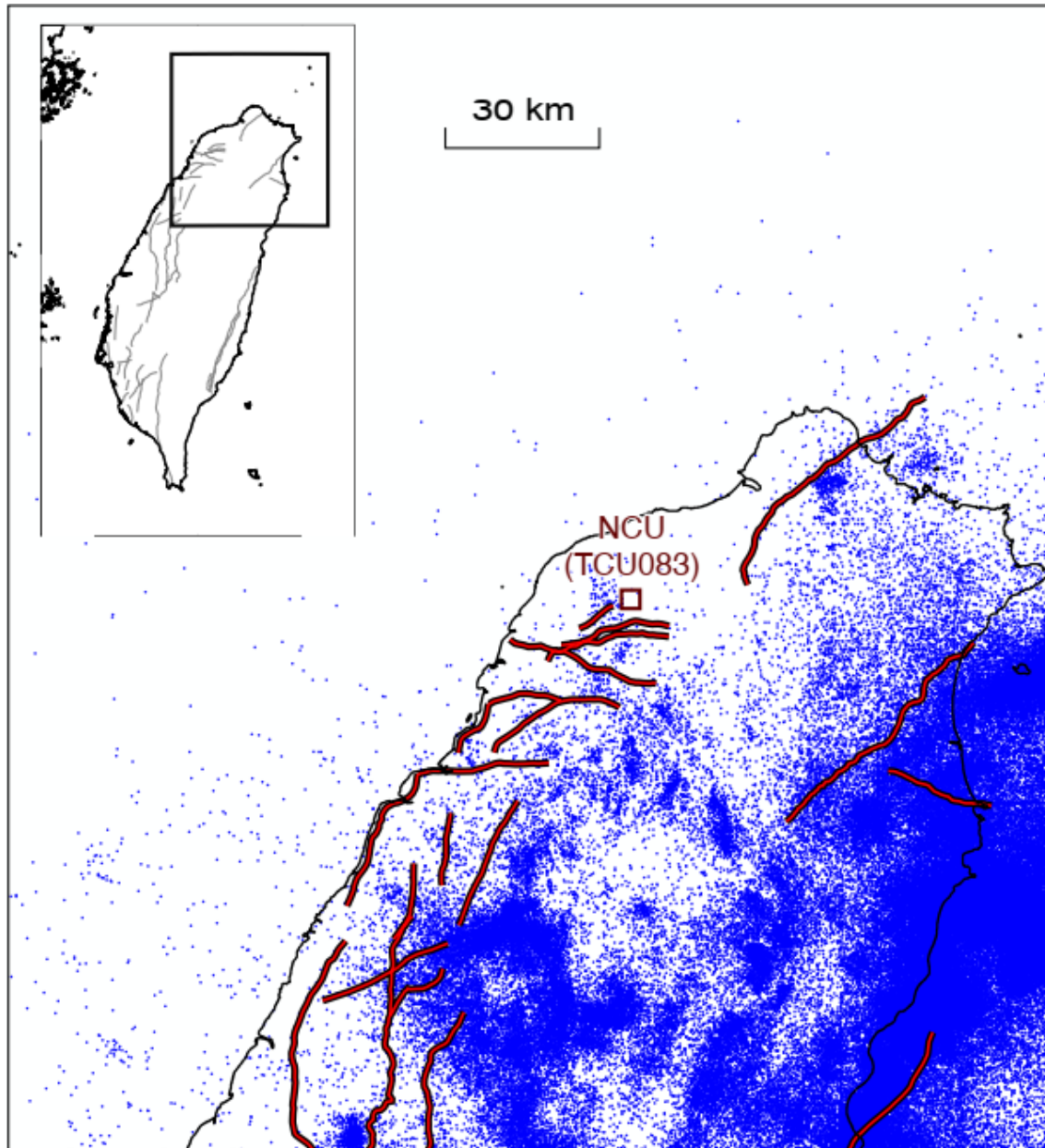


Figure 1: The earthquake epicenter of Northern part Taiwan (figure from Chung-Han Chan)

In this homework assignment, the assessment based on the hypothesis:

1. NCU only affected by the seismicity source, which 100 kilometers away from NCU's location, and

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2. The catalog completeness we used to assess is completed from 1993 to now, and magnitude from 3.0 to 7.

These hypotheses may not match reality; however, it reduced the time to calculate the parameters and configure the input file to compute the seismic hazard model through the Openquake engine.

Table 1: a and b value characterized to 11 regions in this study				
Source id	Source name	a-value	b-value	Source model considered
1	S01	1.4827	-0.3197	Point
2	S04	4.2781	-0.8136	Simple fault
3	S05A	3.85534	-0.99834	Area source
4	S05B	5.04012	-1.01616	Area source
5	S06	4.31138	-0.842981	Area source
6	S09	4.69608	-0.913249	Area souce
7	S10	2.53598	-0.624249	Point
8	S14A	5.0965	-0.907176	Simple fault
9	S14B	5.41959	-0.903679	Area source
10	S15	5.44981	-0.985956	Area source
11	S17A	4.11221	-1.01586	Simple fault

On account of the hypotheses, only 11 sources have been used to compute the hazard scenario for NCU (table 1). For specific source areas, Besides calculating values

of a and b, the source models are also considered. The probability of each fault contributed to the source area is also estimated based on the slip rate of the fault over the total slip rate of whole area faults.

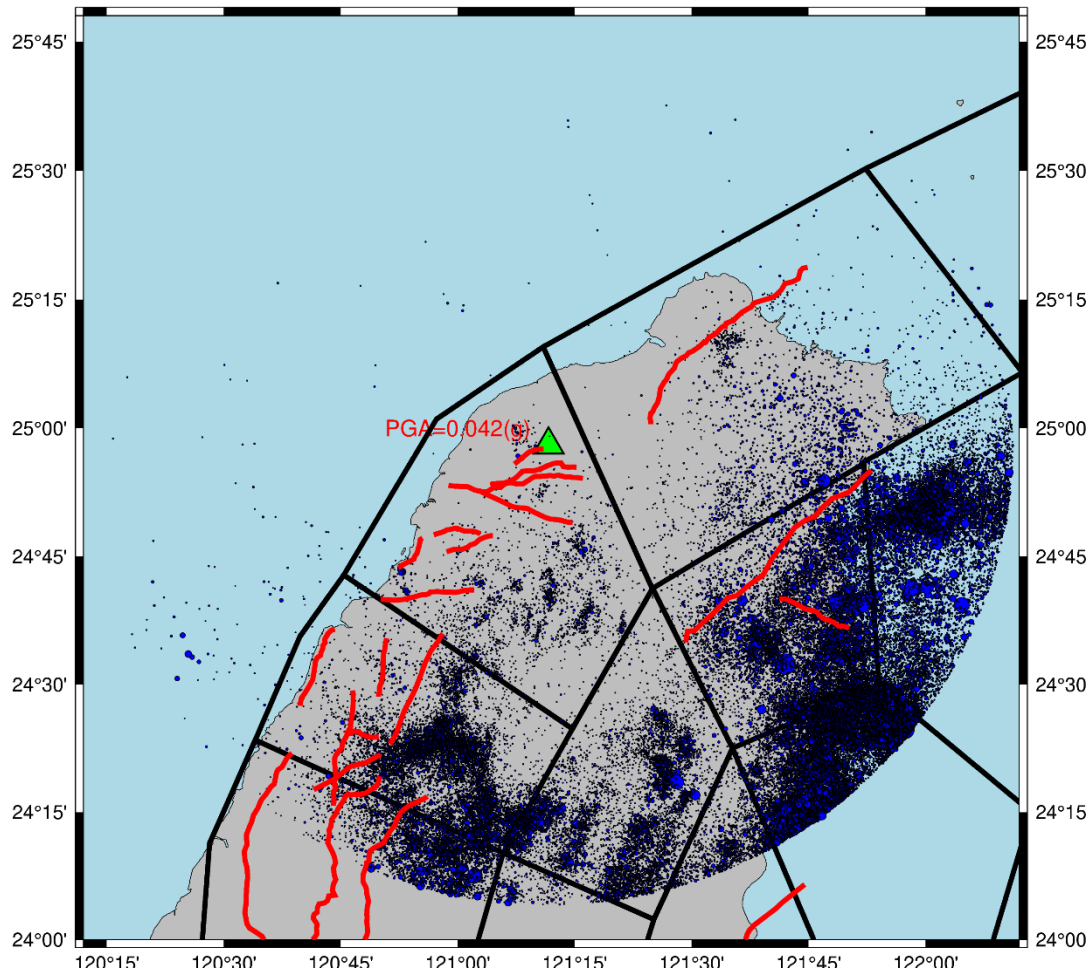
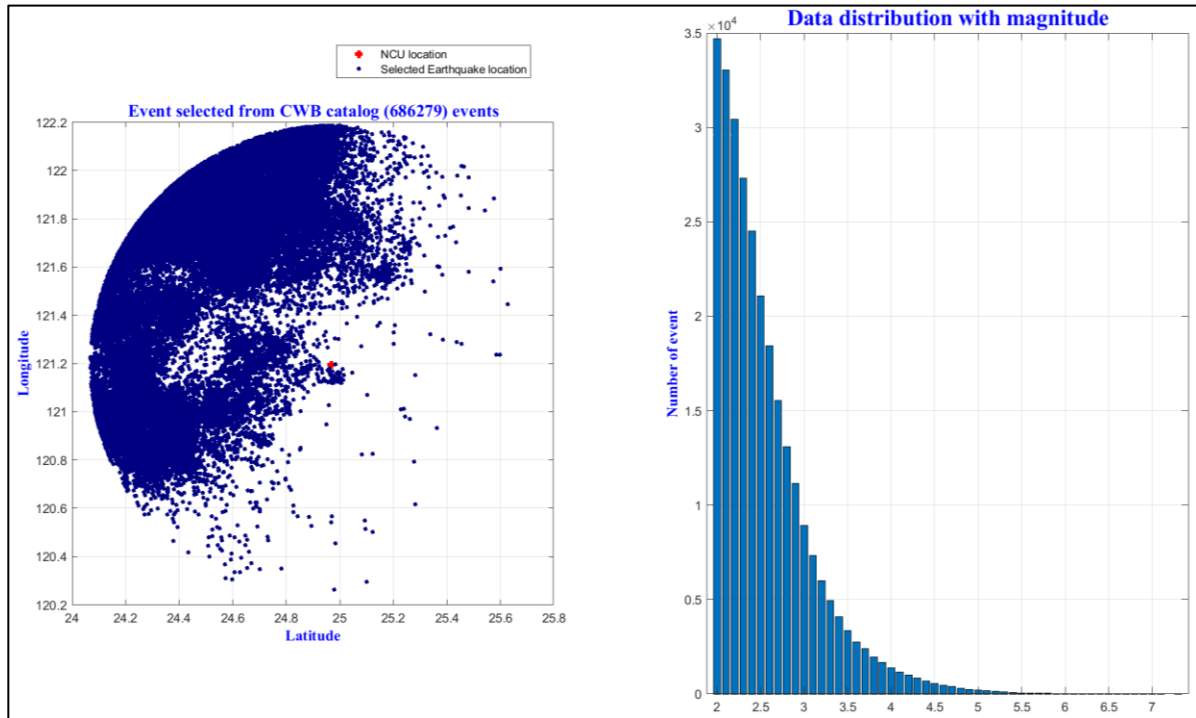


Figure 2: The PGA values on NCU calculated by the seismicity and structures information within 100 kilometers around NCU's location. Green-triangle represents NCU's location, while the source area is demonstrated by the black-line, the red line representing the fault line, and the earthquake events denoted by the blue-circle. The red text indicates the peak ground motion values.

All of the support figures for table 1 are attached in appendix 1.

The code and the report also contained in:

https://github.com/havinhlong1988/PSHA_NCU_demo/

Appendix 1: *The a and b -value for four regions based on the Gutenberg Richter law* a ,**Figure s1:** Catalog statistic 100km from NCU's location.

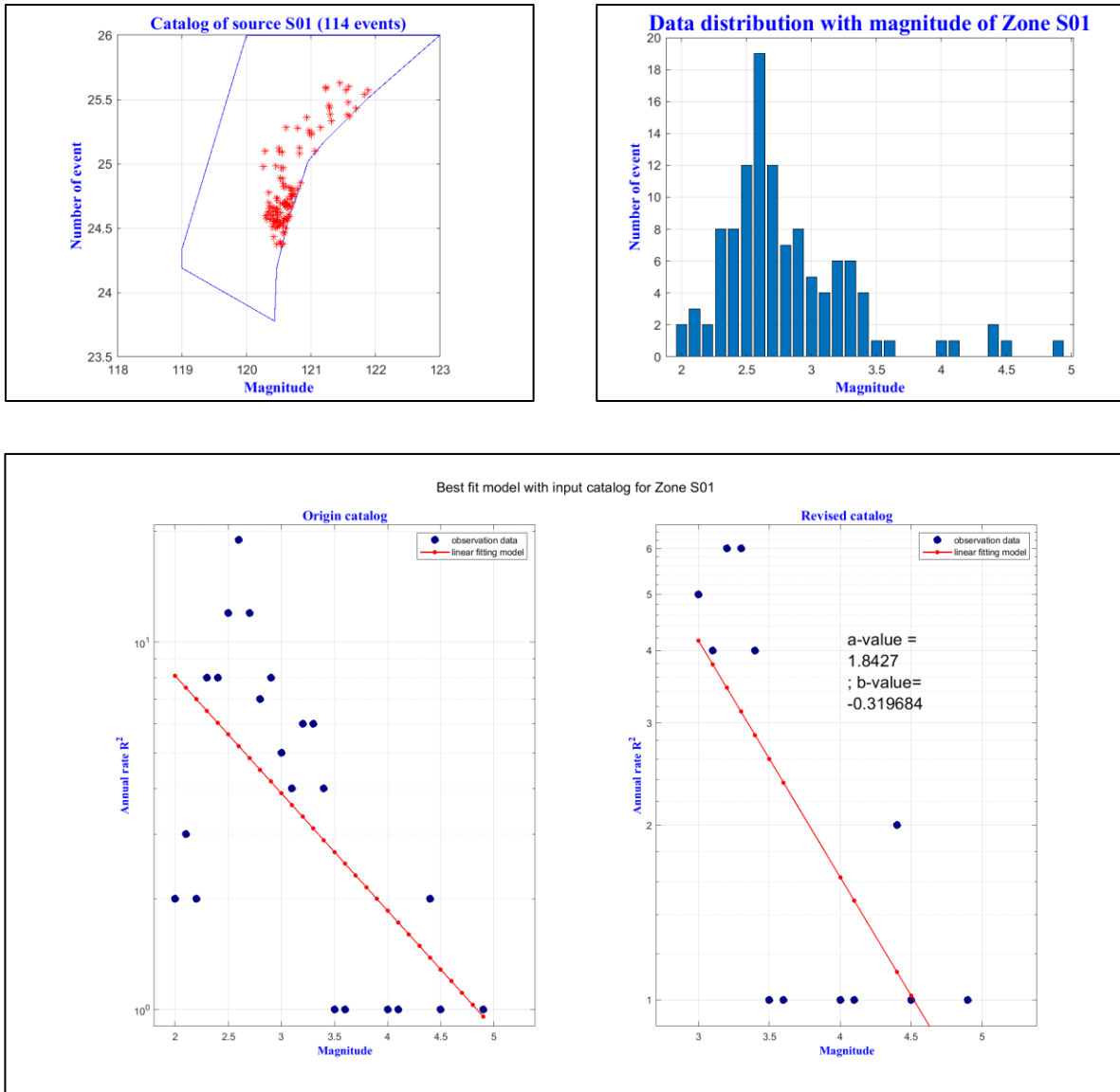


Figure s2: Catalog statistic and GR law calculation for S01 source.

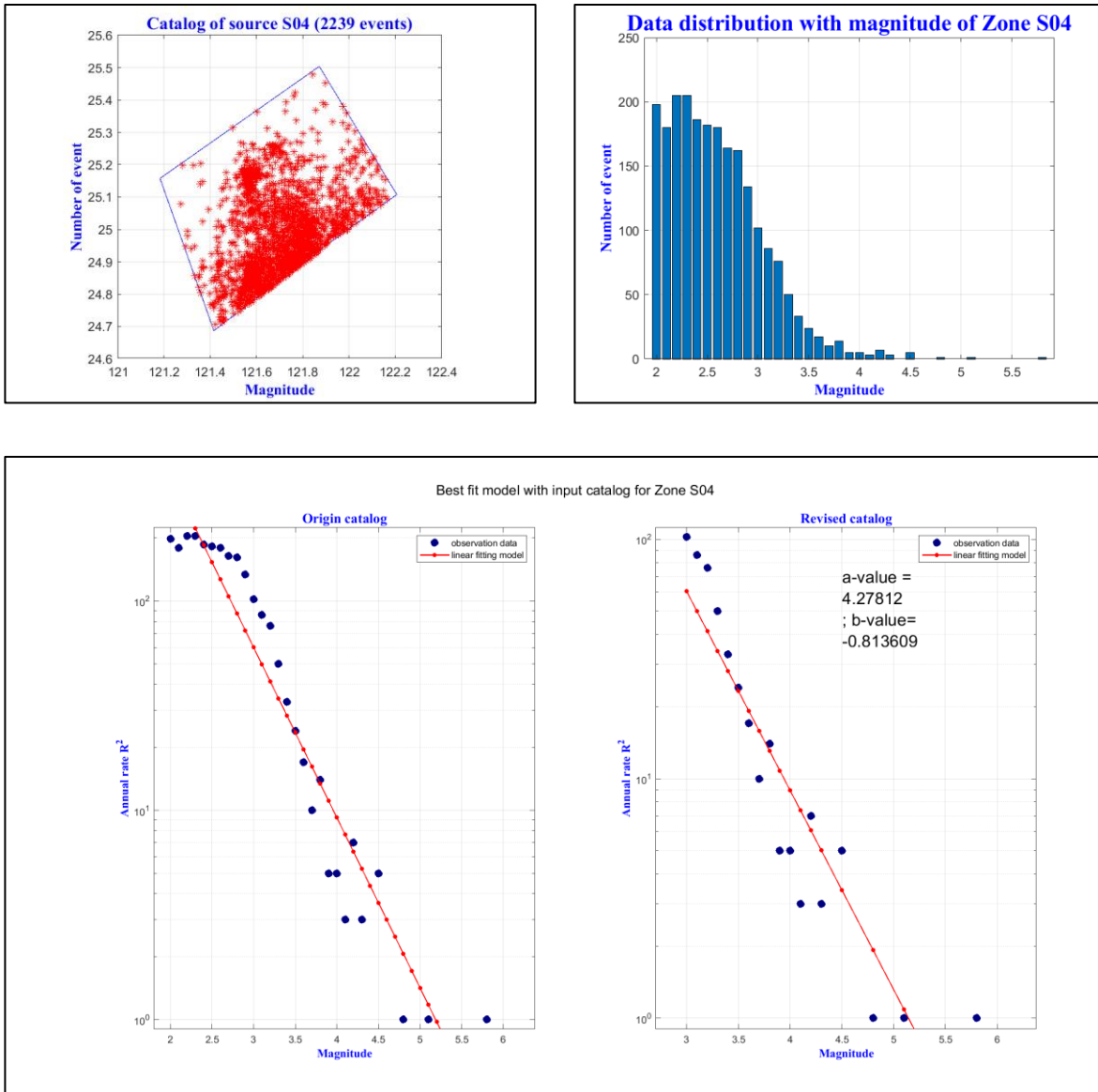


Figure s3: Catalog statistic and GR law calculation for S04 source.

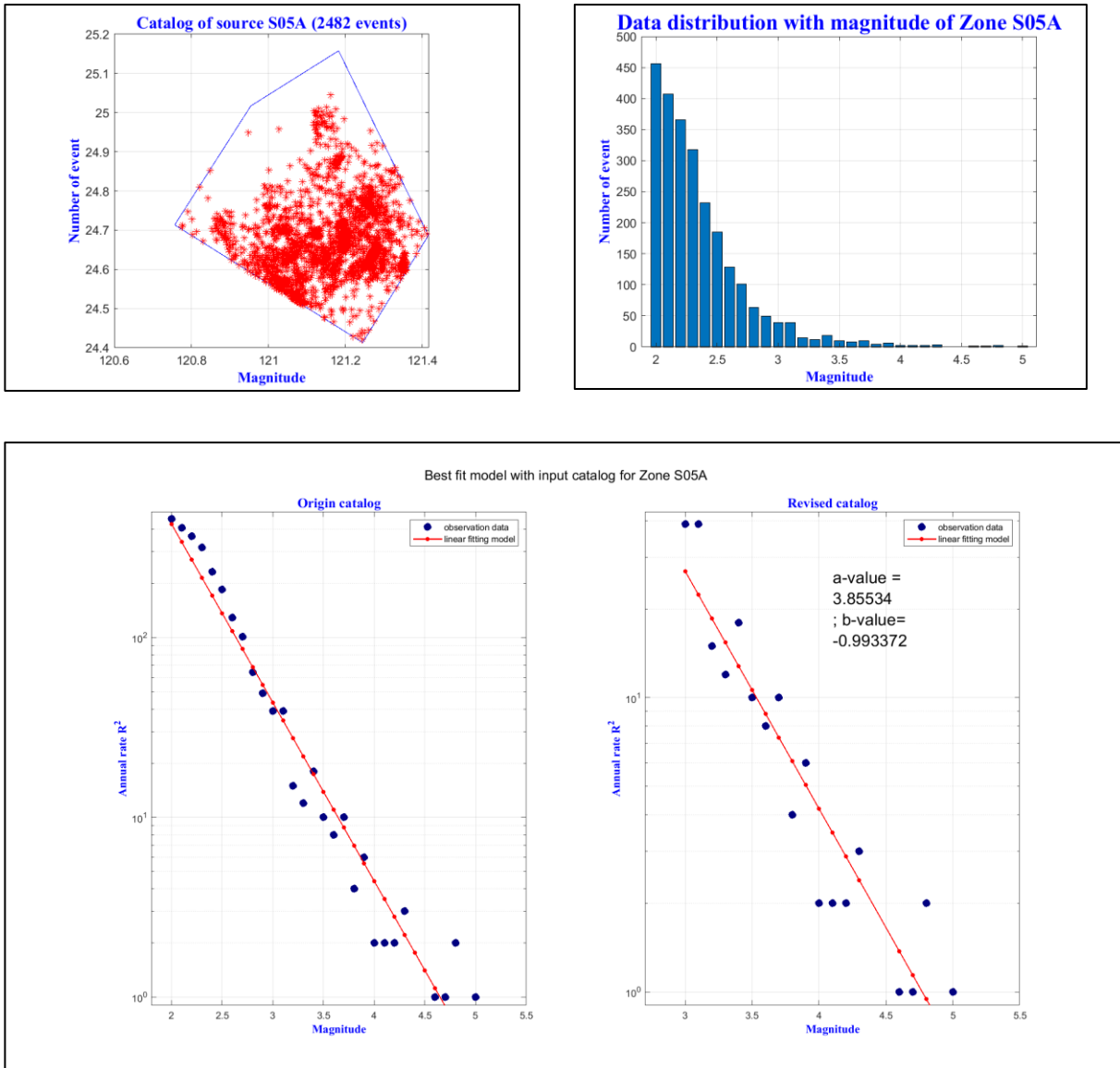


Figure s4: Catalog statistic and GR law calculation for S05A source.

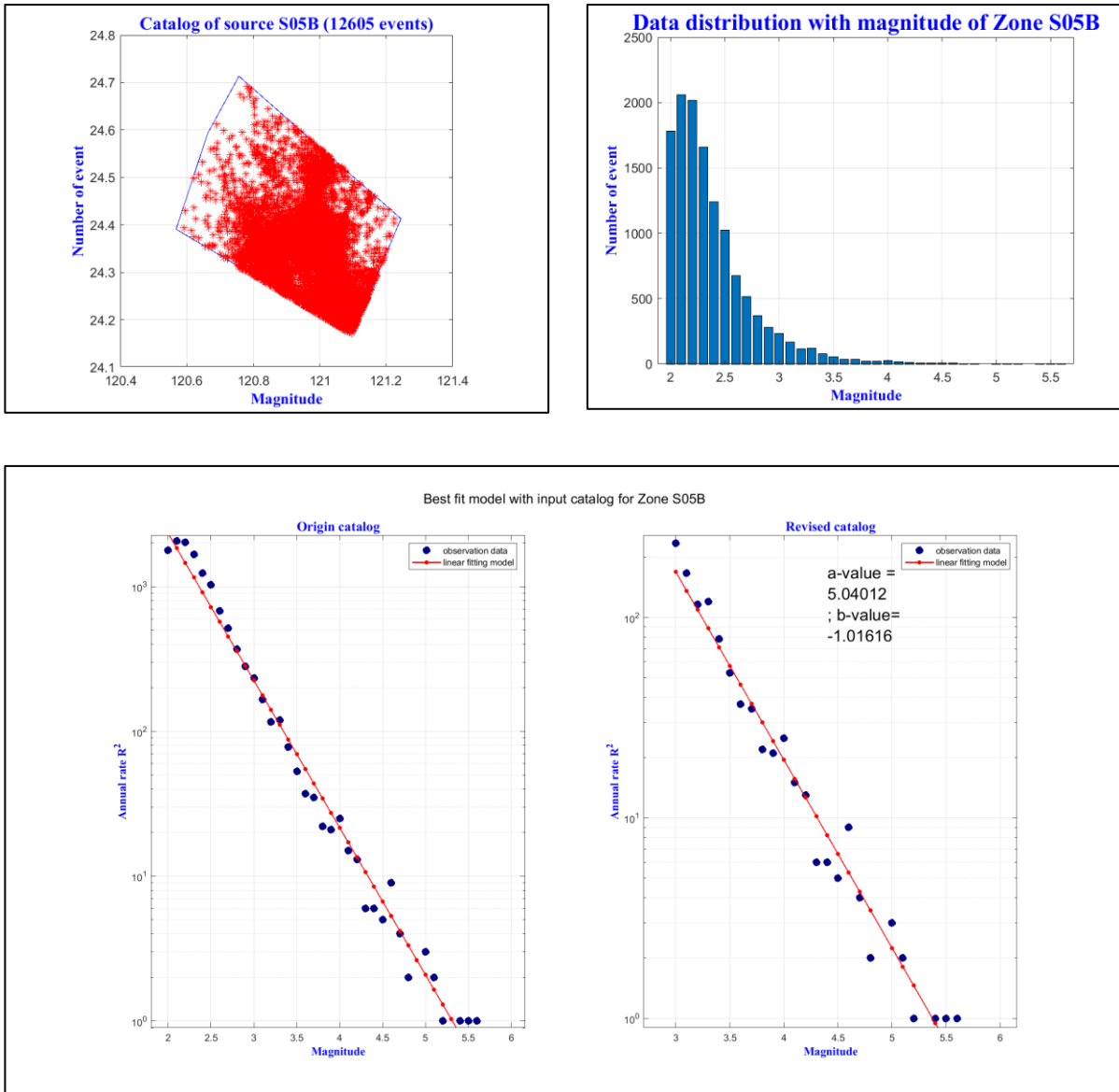


Figure s5: Catalog statistic and GR law calculation for S05B source.

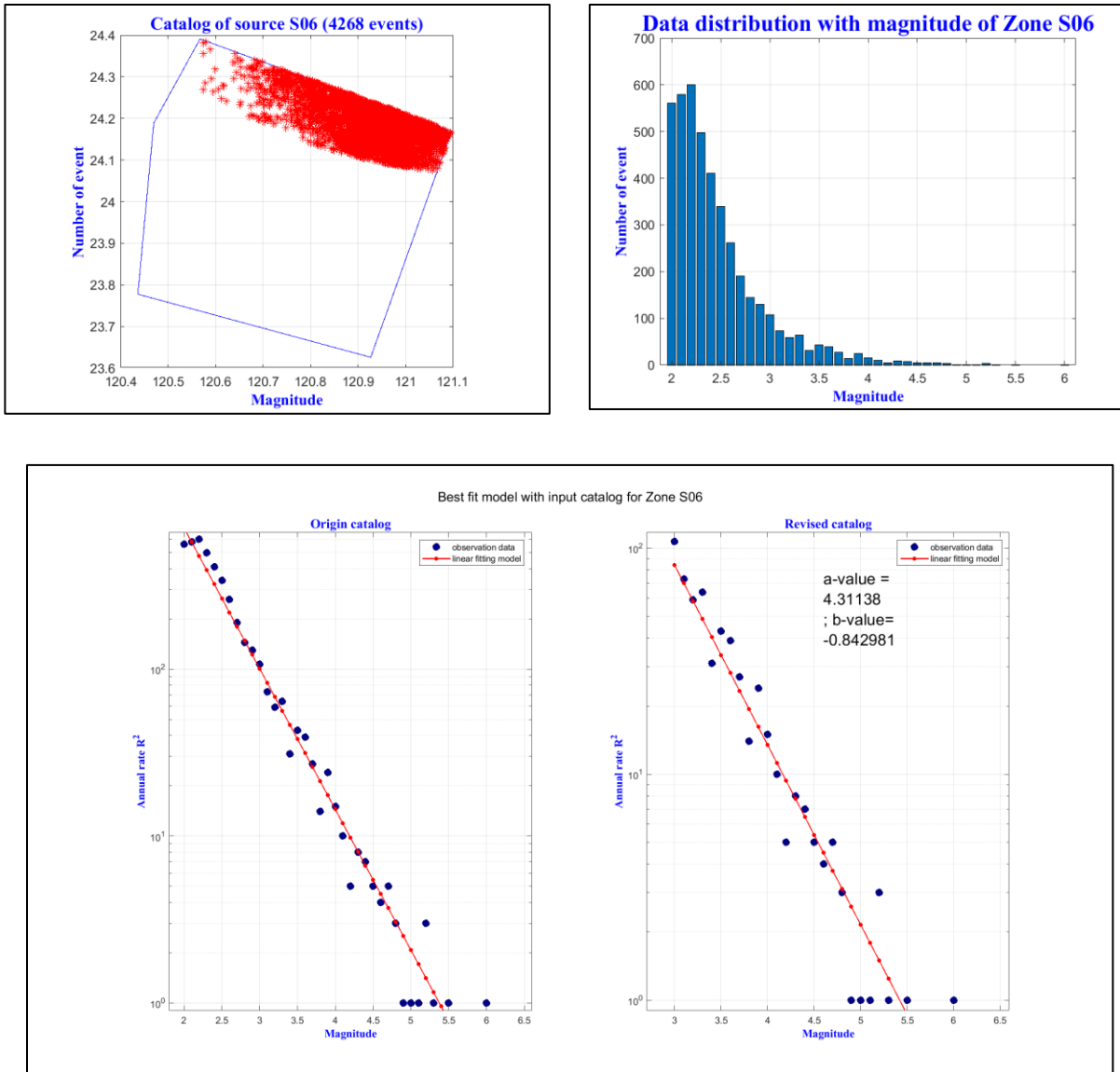


Figure s6: Catalog statistic and GR law calculation for S06 source.

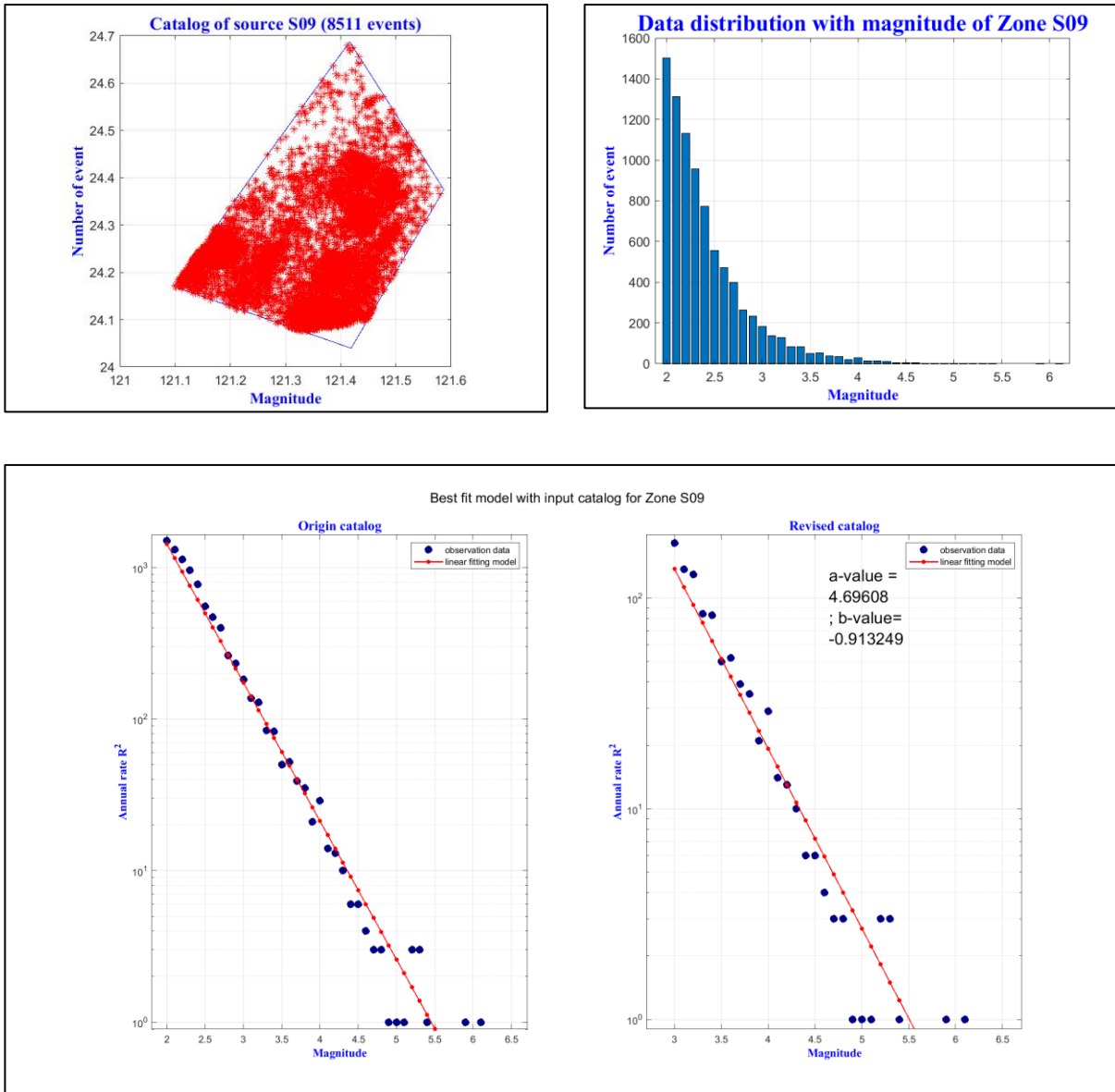


Figure s7: Catalog statistic and GR law calculation for S09 source.

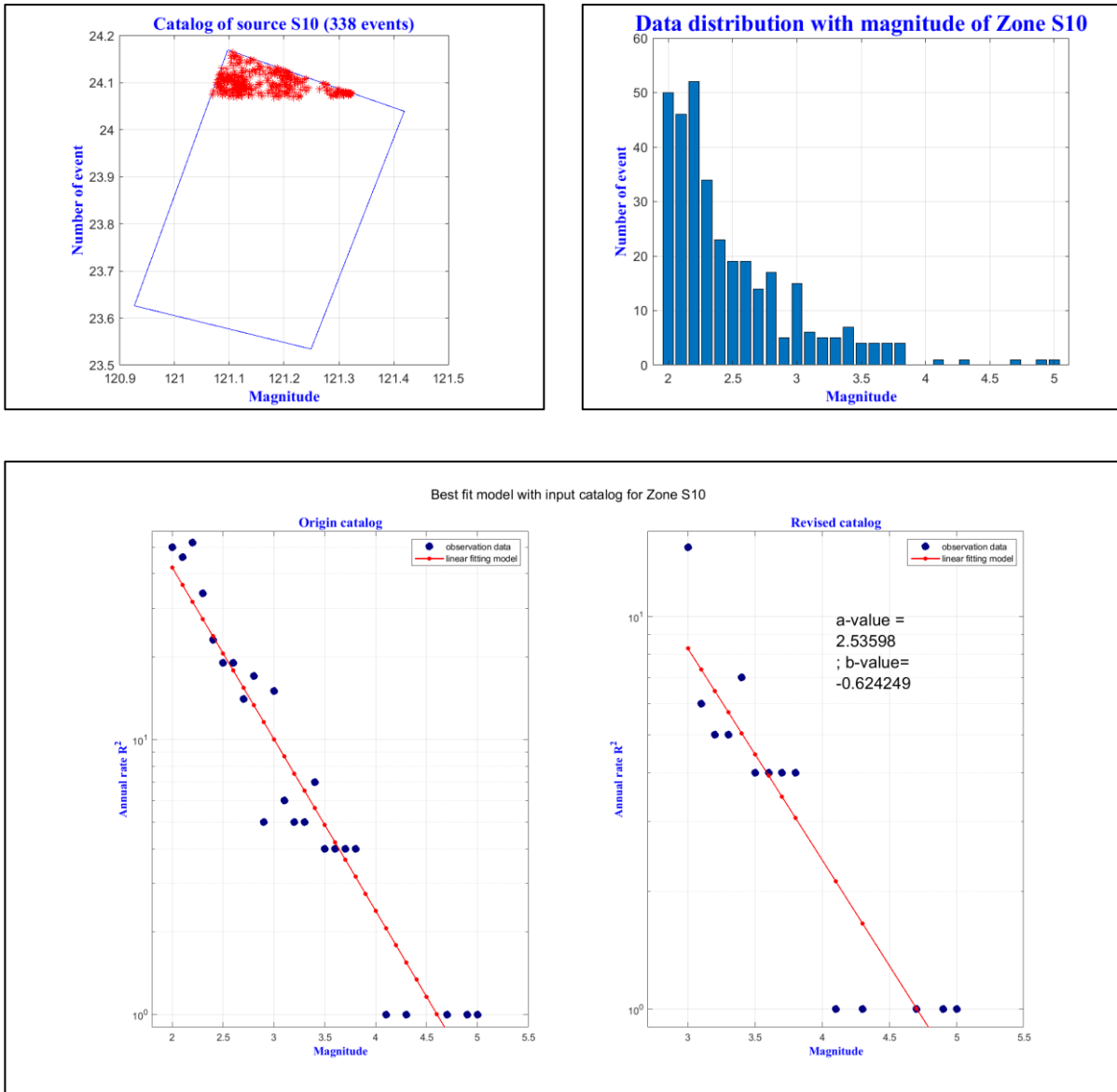


Figure s8: Catalog statistic and GR law calculation for S10 source.

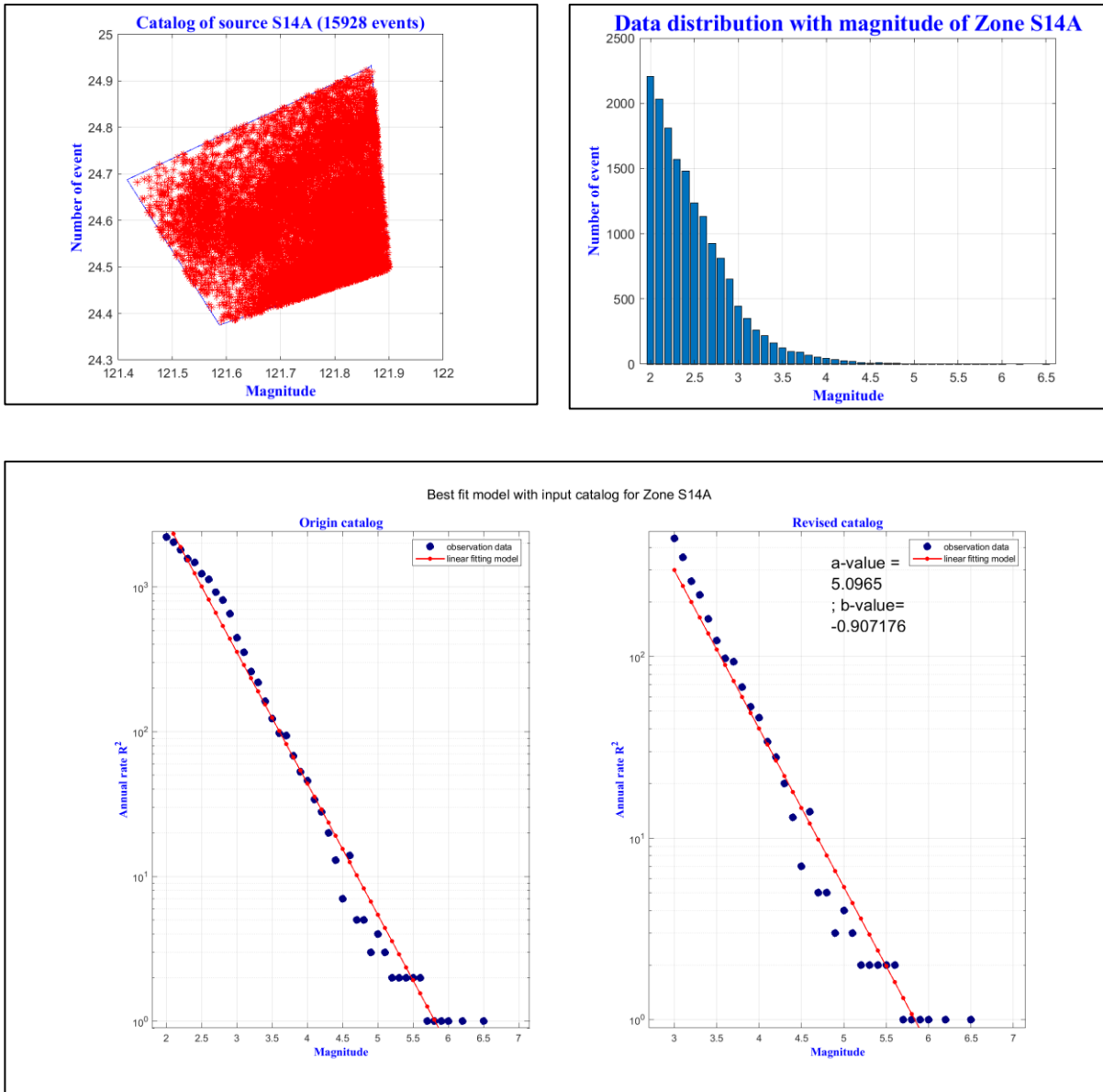


Figure s9: Catalog statistic and GR law calculation for S14A source.

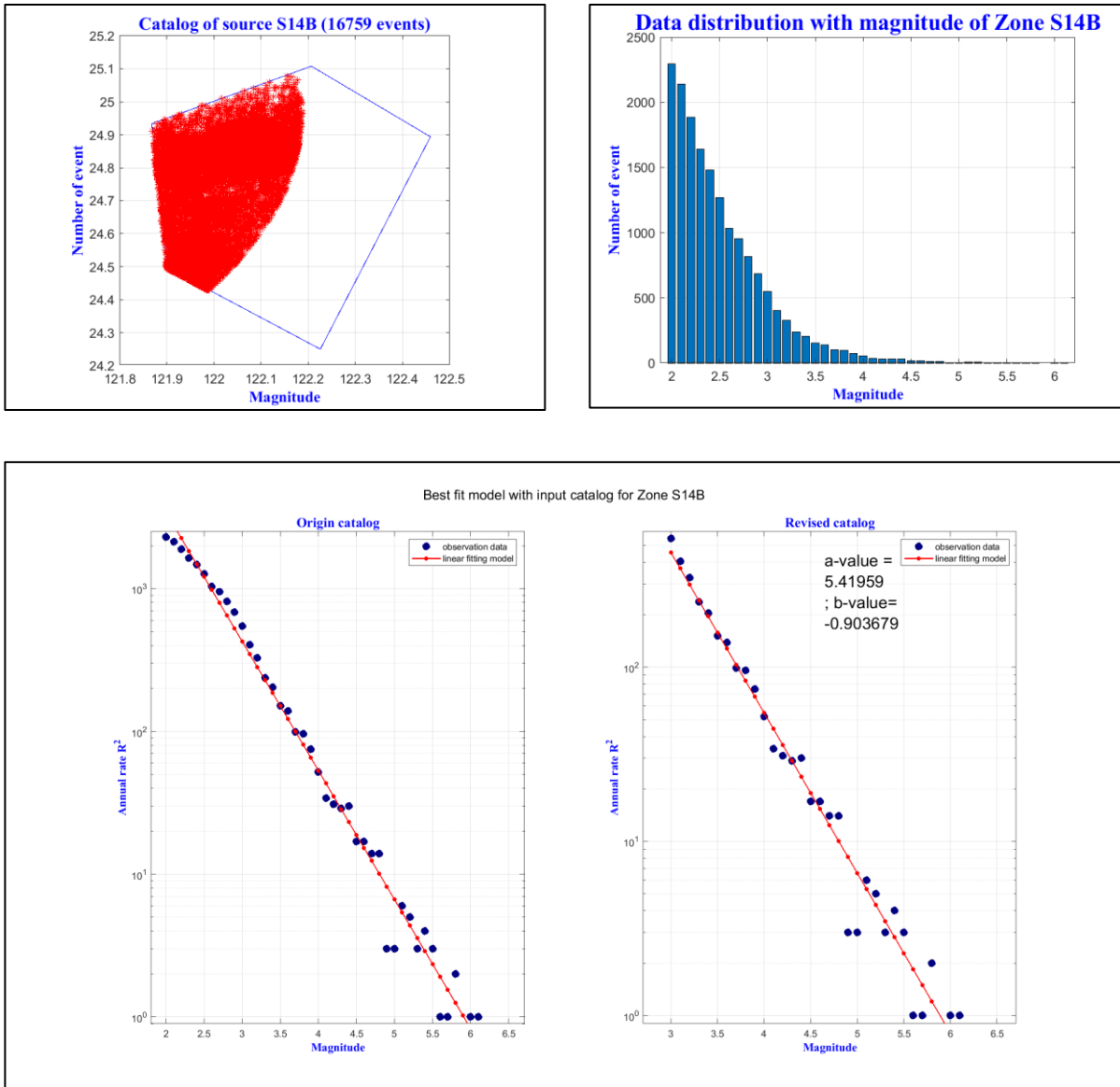


Figure s10: Catalog statistic and GR law calculation for S14B source.

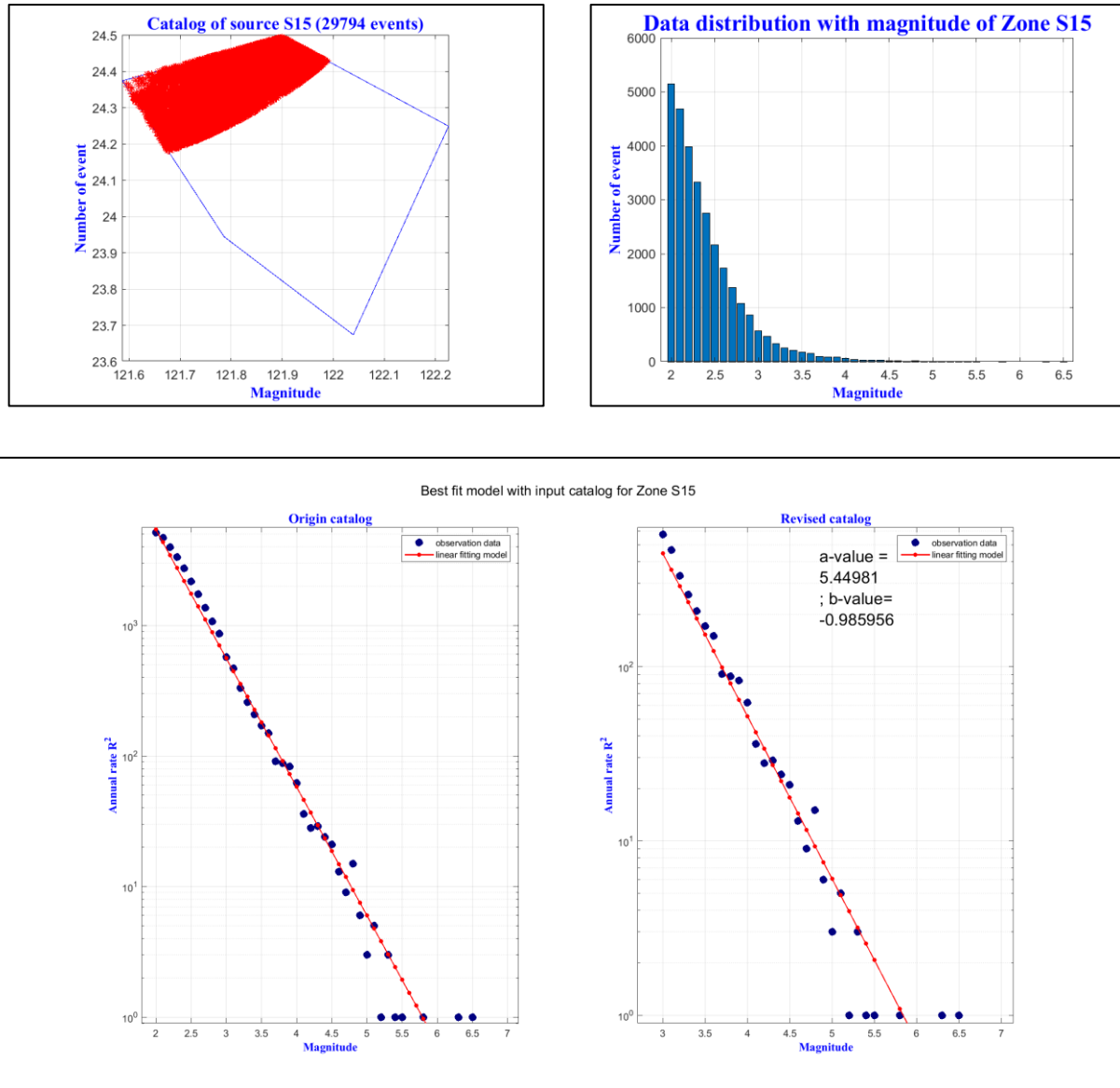


Figure s11: Catalog statistic and GR law calculation for S15 source.

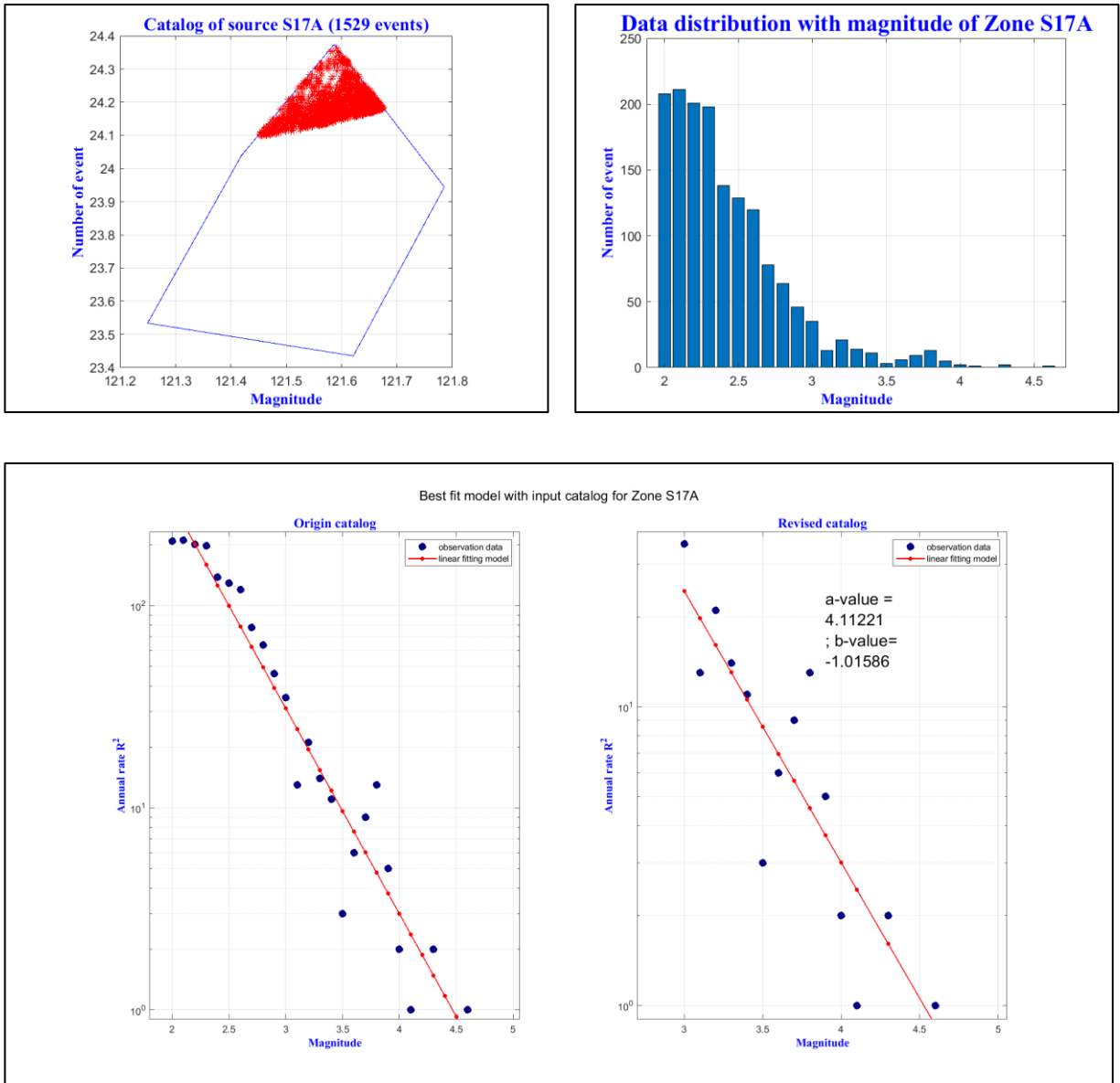


Figure s12: Catalog statistic and GR law calculation for S7 source.