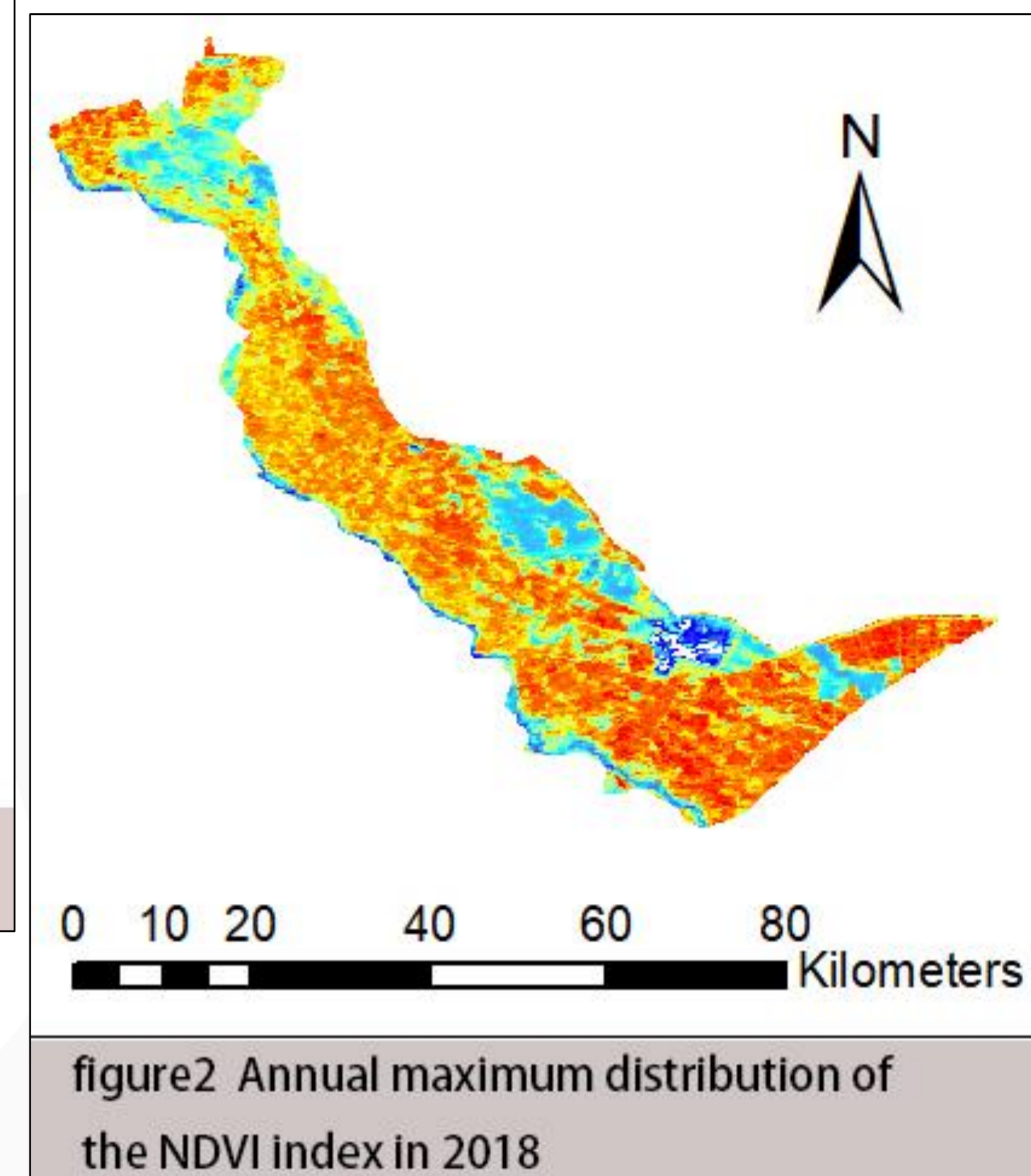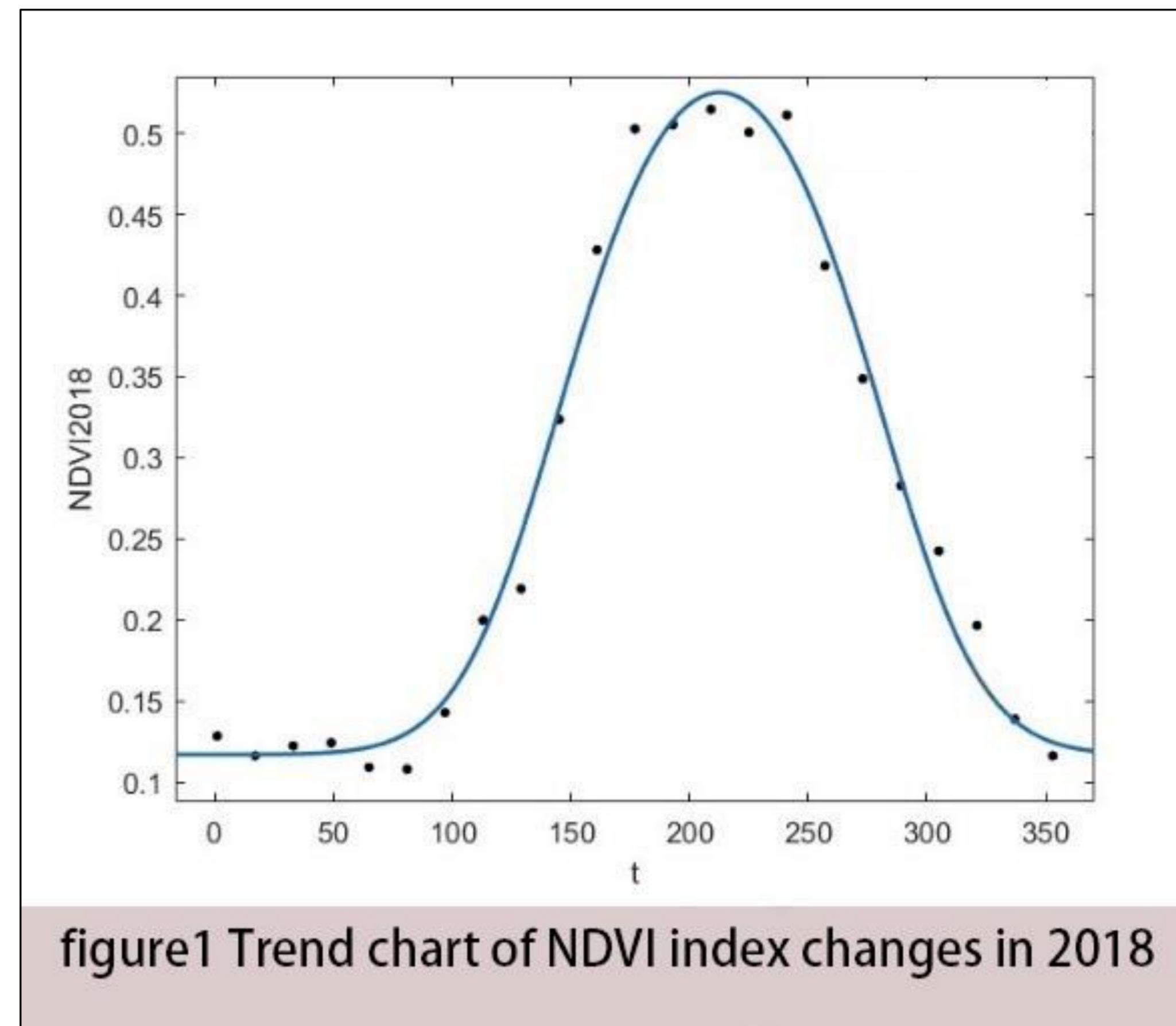# Study on the Main Influencing Factors of Natural Forest and Grass Growth in Arid Area——Taking the Aksu River Basin as an Example

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Objectives

With the development of western China and the gradual urbanization of China's rural areas, the water demand in the northwest arid zone is getting bigger and bigger, while the water supply capacity is getting more and more insufficient. Therefore, it is important to study the relationship between the growth of natural forest and grass and water in arid areas for reasonable extraction of groundwater and distribution of water resources.

figure1 Trend chart of NDVI index changes in 2018

figure2 Annual maximum distribution of the NDVI index in 2018

Methods

The Aksu River Basin was selected as the research object, and the intra-annual trend of the NDVI index was fitted by logistic curve, the spatial distribution of the NDVI index was studied by Arcgis software, and the Mann-Kendall trend test was used to analyze the temporal trend of the meteorological factors, such as temperature, wind speed, and the depth of the groundwater, and the correlation between the NDVI index and the influencing factors was analyzed by Matlab and SPSS. Finally, univariate regression models and multivariate regression models were developed between NDVI index and impact factors.

Conclusions

The five-parameter single-peak logistic curve can fit the intra-annual trend of NDVI index in the Aksu River basin well; the NDVI index in the northeast part of the main stream of the Aksu River is smaller, the NDVI index in the southwest part of the river is larger, and the NDVI index does not change much from year to year; temperature has the greatest influence on the NDVI index; and the relationship between the NDVI index and the influencing factors can be fit by the multivariate regression model, and the fitting results are good.

Results

The five-parameter single-peaked symmetric logistic curve fitted the forest and grass NDVI index well; the correlation between temperature and NDVI index was high, followed by relative humidity, wind speed, and groundwater burial depth, respectively; and the partial correlation analysis showed that temperature contributed to the forest and grass NDVI index to the highest degree, followed by: groundwater burial depth, relative humidity, and wind speed in order. The R^2 of the multivariate regression model was 0.933, which was higher than the R^2 of all univariate regression models.

figure3 Comparison plot of fitted and measured values

XVIII
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