Supplementary materials

Appendix A

Residual diagnostics

Based on the Shapiro–Wilks test, at the significance level $\alpha = 0.05$, it was concluded that the residuals follow a normal distribution (Table S1).

Table S1. Shapiro-Wilk normality test results.

W = 0.9766244394	p-value = 0.582004872

The same was concluded based on the residuals graph, Q-Q normal plot, and residual density graph (Figure S1).

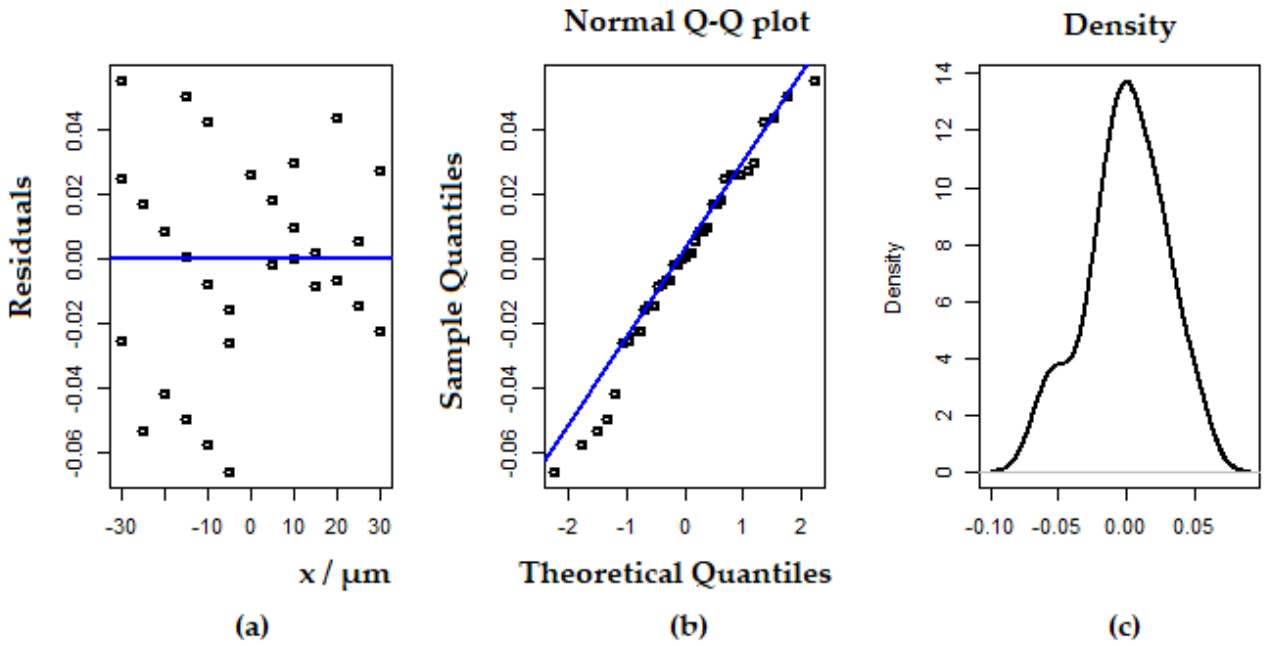

Figure S1. Residual diagnostics: (**a**) Graph of residuals; (**b**) Normal Q-Q plot; (**c**). Residuals density.

Appendix B

Measurement uncertainties calculated by using the law of propagation of uncertainty applied to the functional relationship obtained from the linear regression analysis

In this section, the values of measurement uncertainties for each point of the moderate scale **x** calculated by using the law of propagation of uncertainty applied to the functional relationship of the input data, which was obtained from the linear regression analysis (LRA) were given (Table S2).

Table S2. Measurement uncertainties for each point of the moderate scale x calculated by LRA.

x	−30	−25	−20	−15	−10	−5	0	5	10	15	20	25	30
$\boldsymbol{u_0}^{LRA}$	0.03100	0.03072	0.03048	0.03029	0.03016	0.03008	0.03005	0.03008	0.03016	0.03029	0.03048	0.03072	0.03100

Table 2 shows values for moderate scale $\boldsymbol{x}$ and measurement uncertainties $\boldsymbol{u_0}^{LRA}$ in micrometers.

Appendix C

Rooth of mean squared error values for conformance probability

The comparison of risk models utilizing the root of the mean squared error (RMSE) was conducted both visually and quantitatively. As can be seen from the RMSE values for conformance probability, some measured values significantly deviate from the values of moderate scale. This is especially true for the first realization of the sample $\boldsymbol{y_1}$ on the negative part of the moderate scale (Figure S2).

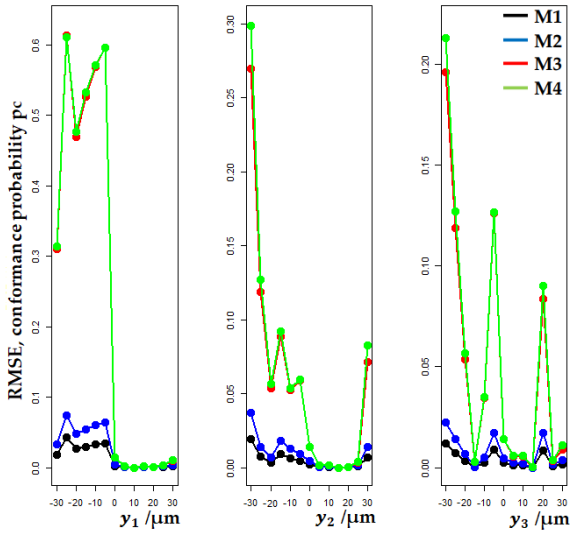

Figure S2. The comparison of the RMSE values for conformance probability, calculated in the values of the moderate scale $\boldsymbol{x}$, for each realization of the sample $\boldsymbol{y_i}, i = 1,2,3$.

Appendix D

Risk surfaces

The width of the acceptance interval is chosen so that the surfaces of the global producers' and the consumers' risk intersect each other. The risk surfaces for the models M1, M2, M3 and M4 are shown in Figure S3, Figure S4, Figure S5 and Figure S6, respectively.

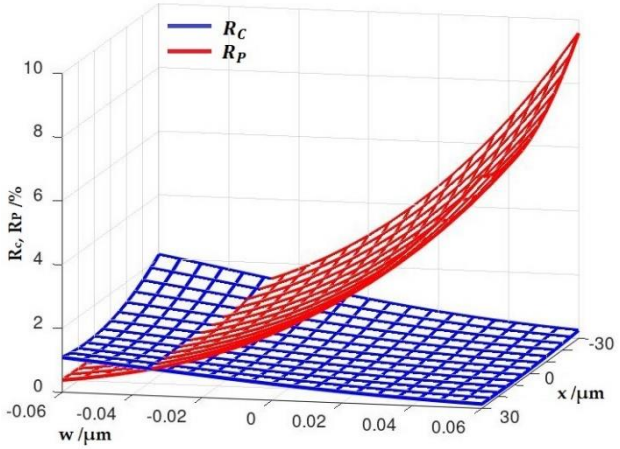

Figure S3. Risk surfaces for model M1.

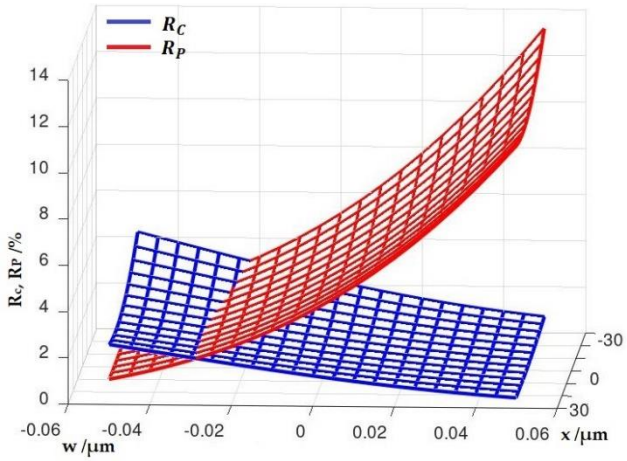

Figure S4. Risk surfaces for model M2.

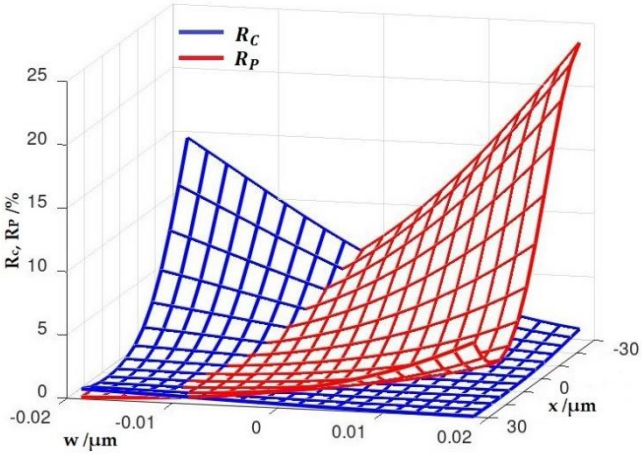

Figure S5. Risk surfaces for model M3.

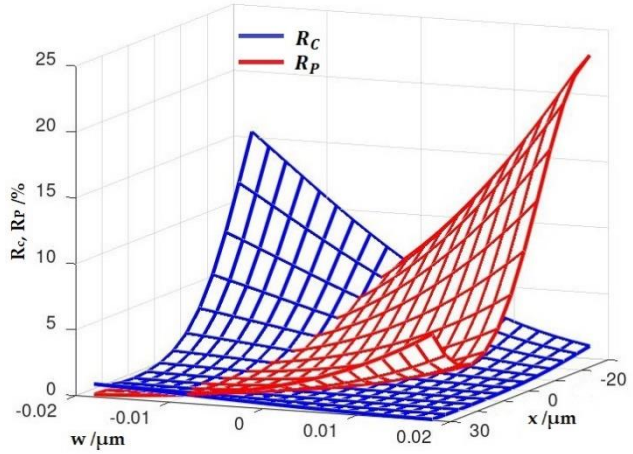

Figure S6. Risk surfaces for model M4.