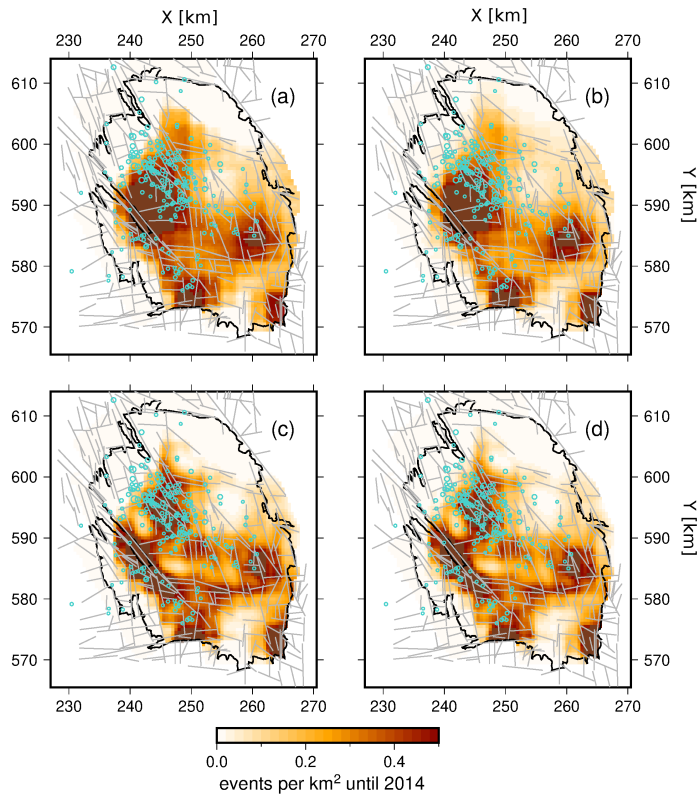## S1 Supplements

Fig. S1 Maps of modeled seismicity for the Groningen field until 2014 for the two models: linear CM_{subcr} (a and c) and RS (b and d) based on compaction strain. The fault density map shown in Figure 3a is considered for the seismicity maps in figures c and d. The observed earthquakes of M $\geq$ 1.5 until 2014 are plotted as magnitude scaled turquoise circles. For model details see Table 1
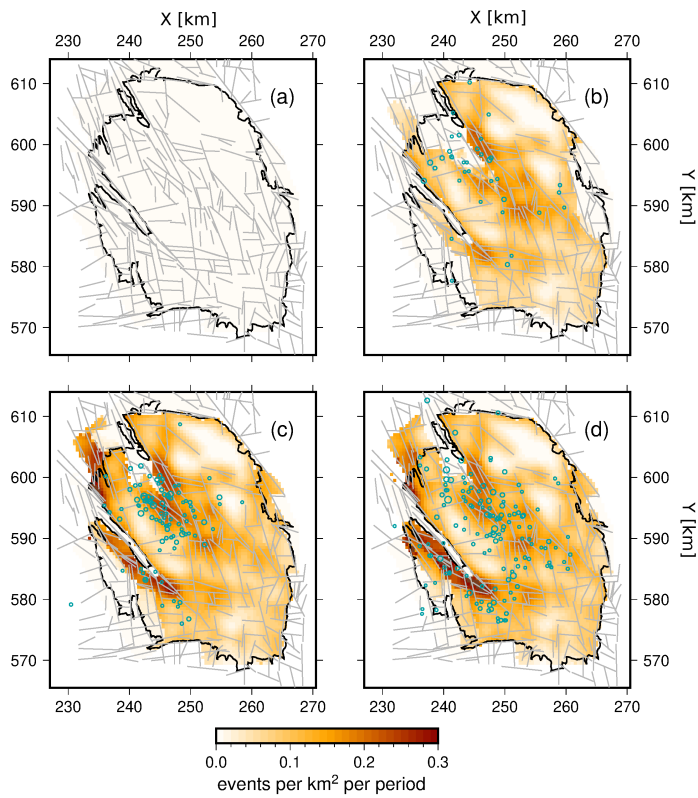
Fig. S2 Maps of summed modeled seismicity for four time slices based on the CM_{subcr} for pressure changes as given in Table 1. (a) 1960-1991, (b) 1991-2000, (c) 2000-2010, (d) 2010-2017. The observed earthquakes of M $\geq$ 1.5 for the according time period are plotted as magnitude scaled turquoise circles.
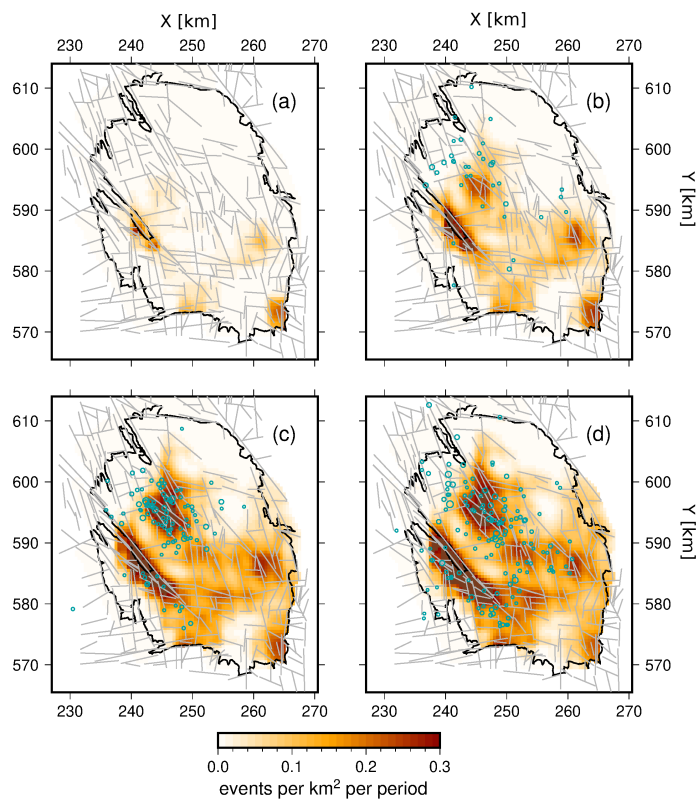
Fig. S3 Maps of summed modeled seismicity for four time slices based on the RS model for compaction strain as given in Table 1. (a) 1960-1991, (b) 1991-2000, (c) 2000-2010, (d) 2010-2017. The observed earthquakes of M ≥ 1.5 for the according time period are plotted as magnitude scaled turquoise circles.
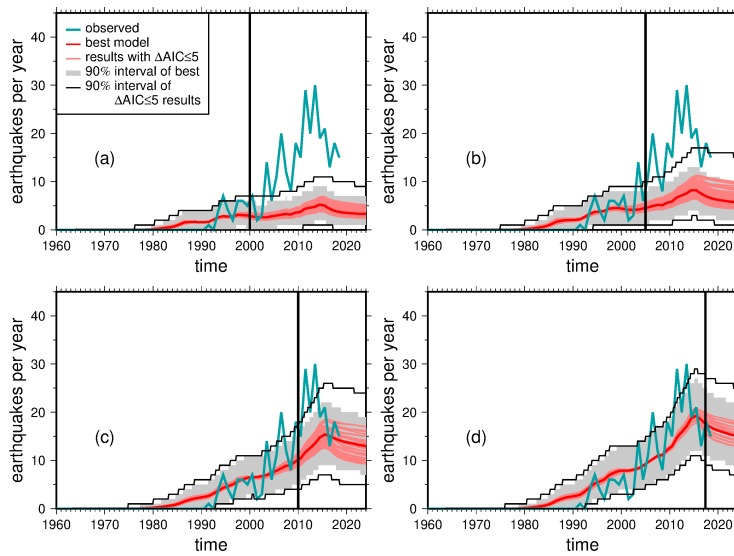
Fig. S4 Seismicity rates as a function of time. The predictions of the RS model based on compaction strain are shown for the best parameters and parameters with similar good results ($|\Delta AIC| \leq 5$)) like in Figure 8. The time limit for the parameter fit is marked by the vertical line: (a) 1960-2000, (b) 1960-2005, (c) 1960-2010 and (d) 1960-2017. The 90%-confidence interval related to the optimal fut is shown and additionally for the similarly good solutions displaying the uncertainties of the model results. The observed rate of M ≥ 1.5 earthquakes is shown as turquoise curve.
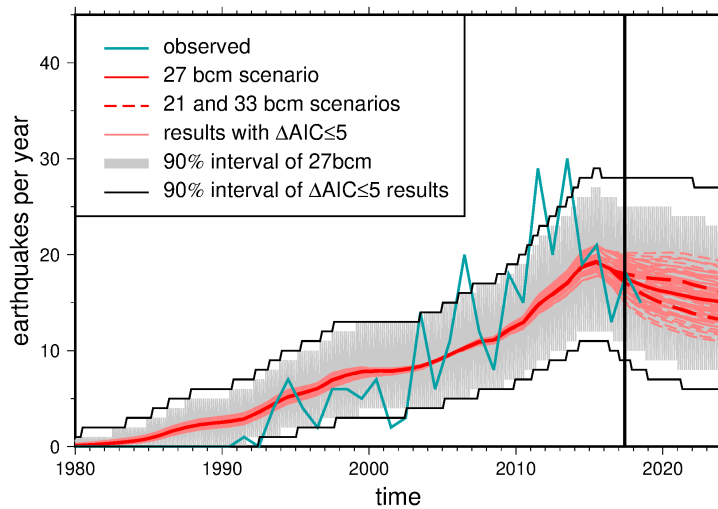

Fig. S5 Predicted seismicity rates based on compaction strain as a function of time for the three production scenarios between 2014 ans 2024. The end of the fitting period for the parameter estimation is indicated by the vertical line. The observed number of earthquakes of M ≥ 1.5 per year until 2019 is shown as turquoise curve. The model uncertainties are displayed like in Figure S4.