**Contents**

Folders “Figures” and “Table\_AIC\_BIC\_DF\_LL\_Deviance” contain supplementary material described in the manuscript Visini et al., 2024 EQSpectra.

Folders “Analyse\_SUREvers2\_database”, “Regressions” and “Model” contains matlab scripts.

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**This guide illustrates steps to analyze the SURE2.0 database, perform regressions and calculate PFDH curves.**

1) Unzip file SURE-main.zip

2) Copy and paste the folder SURE-main (containing the folder SURE2.0\_ruptures and the file SURE2.0\_Slip\_Obs\_matlab.xlsx) into the folder "Analyse\_SUREvers2\_database"

Note that point 2) is necessary as the unzip creates extra sub-folder SURE-main.

The folder “Analyse\_SUREvers2\_database” contains conde to anaòyse the database and produce tables.

1. A1\_compute\_r.m compute r- distances for normal and reverse from a list of events: list\_Normal.txt and list\_Revers.txt
2. A2\_union\_table\_r.m merge the tables calculated by A1\_compute\_r.m
3. B1\_interpolate\_PF\_coseismicslip.m and B2\_interpolate\_R15\_coseismicslip.m calculate throw values on the PF and on the R1.5 from values in the database
4. C\_compute\_s.m calculate the s-distances
5. P1\_prepare\_shapefile\_distanze\_r.m and P2\_prepare\_shapefile\_distanze\_s.m create shapefiles of r and s distances (segments) to be visualized on a GIS

The folder “Regressions” contains codes to perform regressions, calculate median and standard deviation of the expected throw, calculate F ratio and perform Monte Carlo simulations.

1. A1\_Script\_LOGISTICmultislicedimensions\_20231019 calculates the parametres of the logistic regressions.
2. B1\_script\_fitlme\_residual\_20231006.m computes regression to estimate median throw and standard deviation of DR
3. C\_ratio\_DR2lenght\_vs\_PFlenght\_20240729.m calculates the ratio between DR and PF lengths

The folder “Model” contains codes to perform a forward modelling.

1. A\_Montecarloprobability\_at\_the\_site\_20231023.m calculates the P of DR rank 2 occurrence at site using a montecarlo approach
2. B\_build\_logistic\_Comb\_A.m, B\_build\_logistic\_Comb\_B.m and B\_build\_logistic\_Comb\_C.m calculate probailities of DR occurrence for a specific combination
3. C\_Calc\_ThrowPFmean.m calculate ThrowPFmean
4. script\_combA\_pfdhcurves.m script\_combB\_pfdhcurves.m and script\_combC\_pfdhcurves.m calculate curves of probability of exceedance for a specific combination