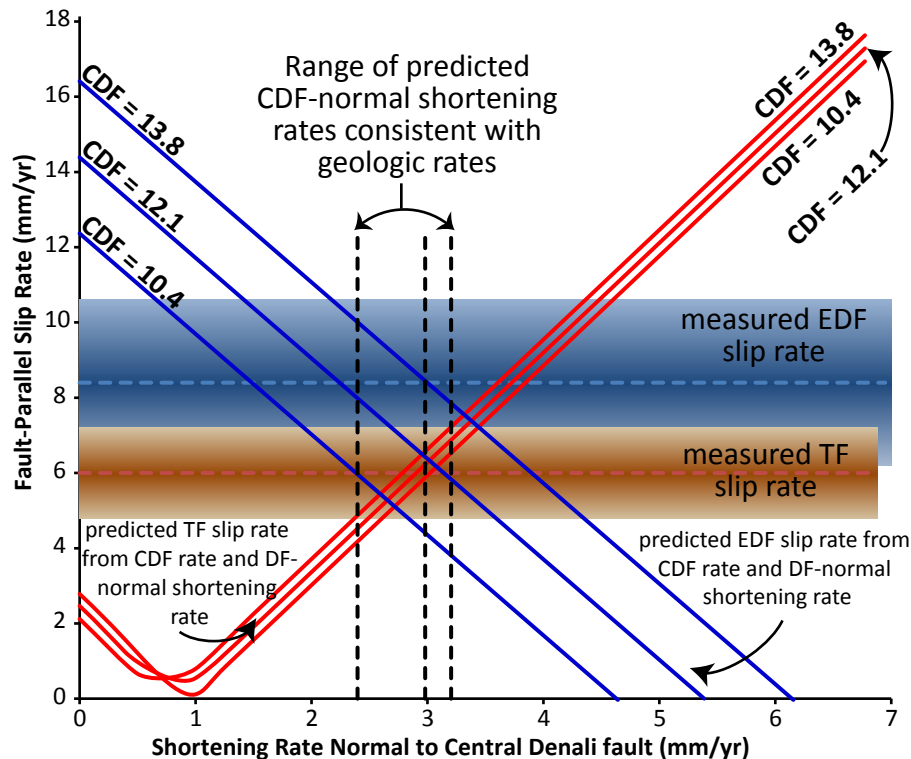


Supplementary Material.



Plot of measured and predicted slip rates for fault sections connecting at the Denali-Totschunda fault intersection. Using the midpoint and the endpoints of the mean slip rate value for the central Denali fault of 12.1 ± 1.7 mm/yr (Matmon et al., 2006), we use the geometry illustrated in Figure 6 and basic trigonometry to predict possible fault-parallel slip rate values for the eastern Denali fault (blue lines) and the Totschunda fault (red lines) for a range of possible central Denali fault-normal shortening rates. Recognizing that there is a single Denali fault-normal shortening rate value that results from the combined eastern Denali and Totschunda fault slip rates, the black vertical lines depict the possible range of central Denali fault-normal shortening rates. These rates are constrained as where a single shortening rate intersects with predicted eastern Denali fault rates (blue sloping lines) and Totschunda fault rates (red sloping lines) within the corresponding fields for measured slip rates for the eastern Denali and Totschunda faults (blue and red horizontal lines with gradient fills, respectively). A shortening rate of ~ 3 mm/yr combined with a central Denali fault slip rate of 13.8 mm/yr provides a best fit for our model configuration as this represents the closest match with measured geologic rates.