SWAT modeling for assessing future scenarios of soil erosion in West Rapti River Basin of Nepal

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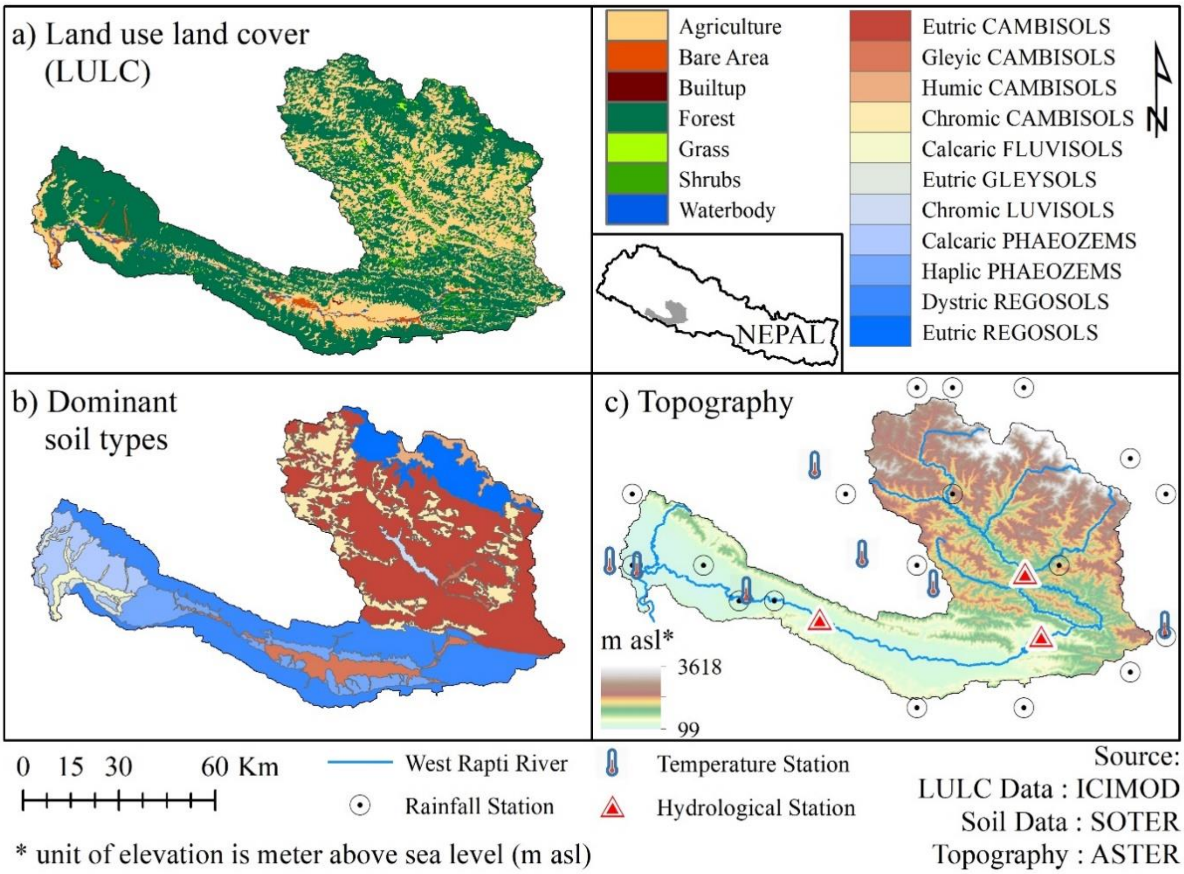
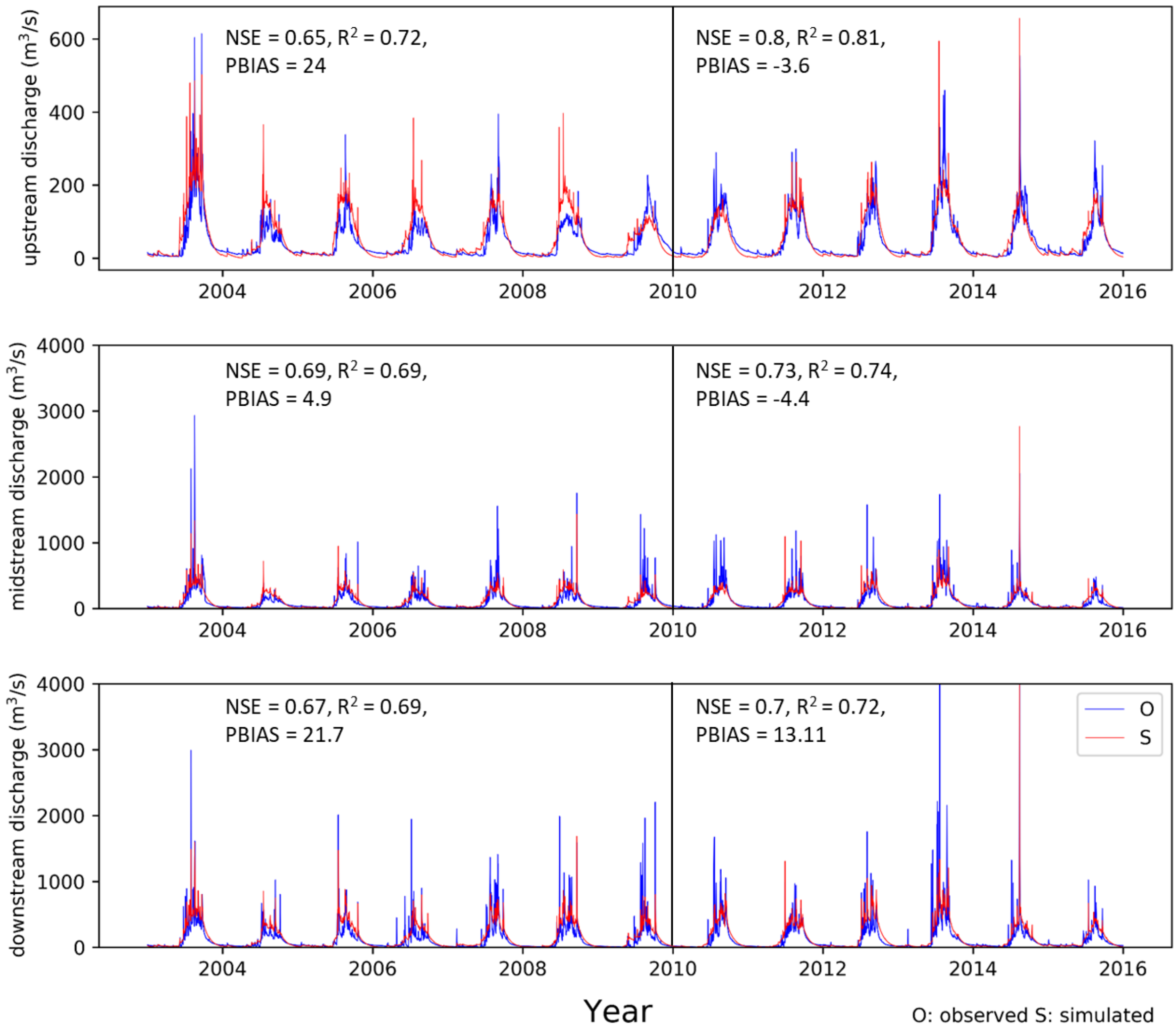
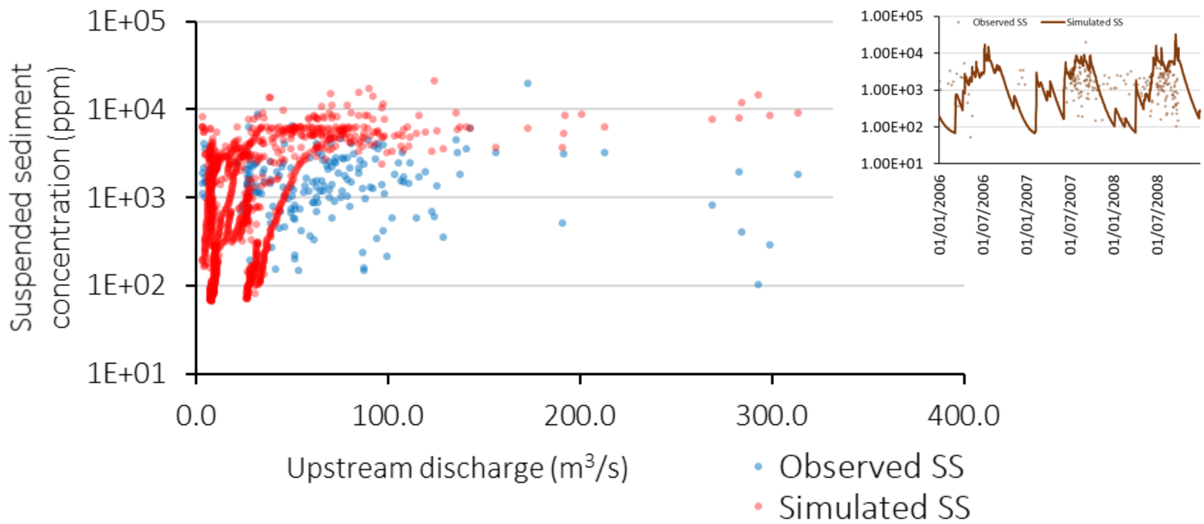


a) Land use land cover (LULC), b) soil data, and c) topography of the West Rapti River basin (WRRB). Network of hydro-meteorological stations is superimposed over the topography of the study area.

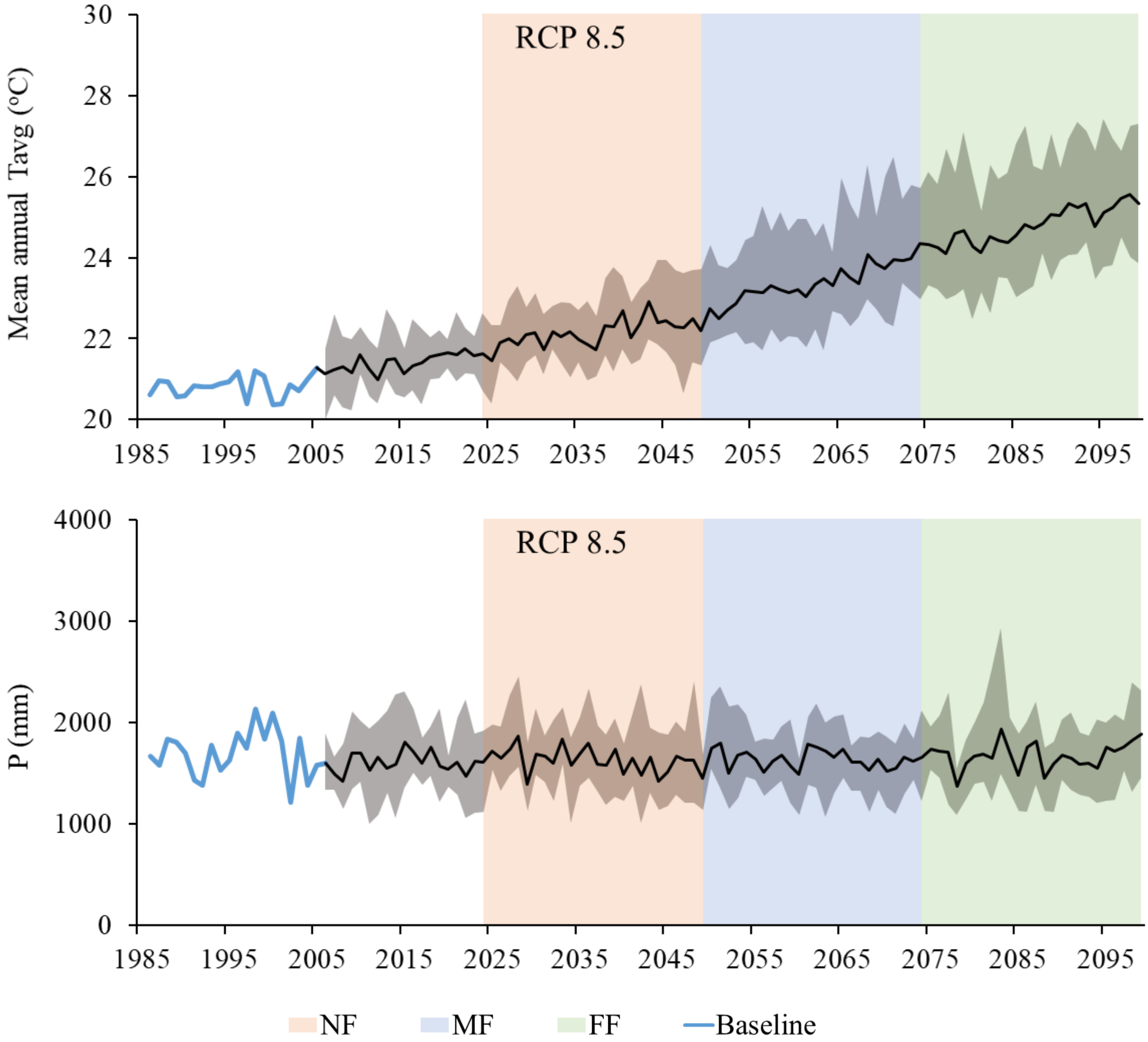


Overall, better performed during validation period (2010 – 2015). Model still needs fine tuning of parameters.

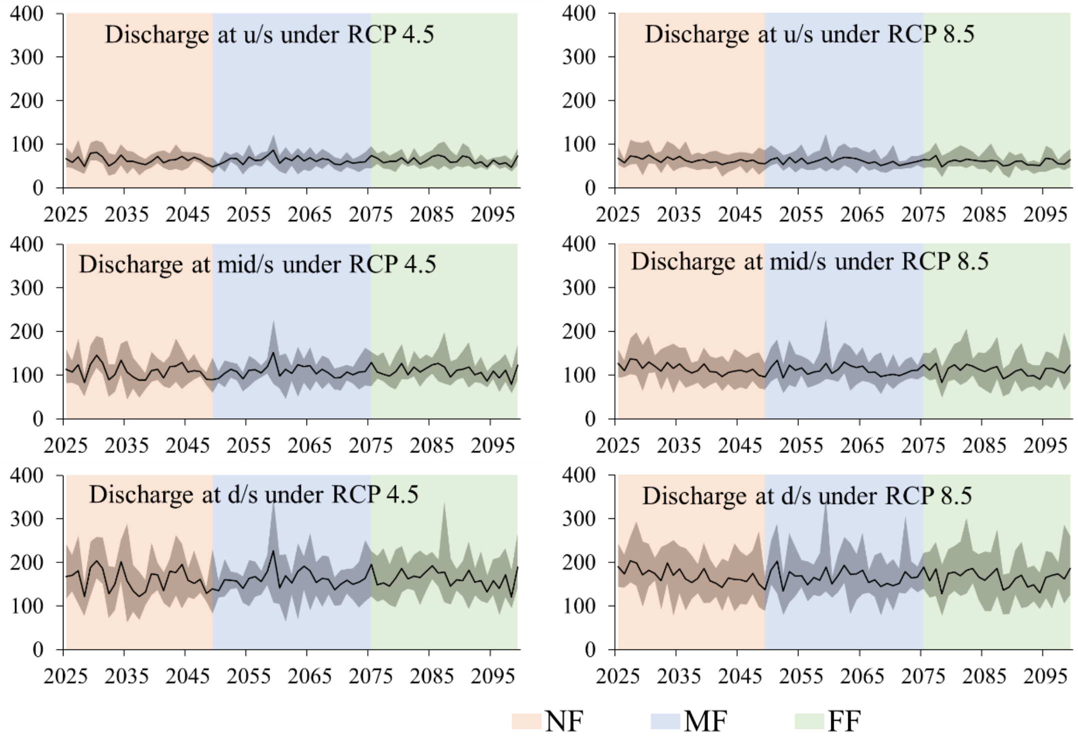


Suspended sediment (SS) concentration vs river discharge at upstream hydrological station for the period of 2006 – 2008. Dynamic variability of SS has not been captured. Simulated SS typically follows the pattern of river discharge.

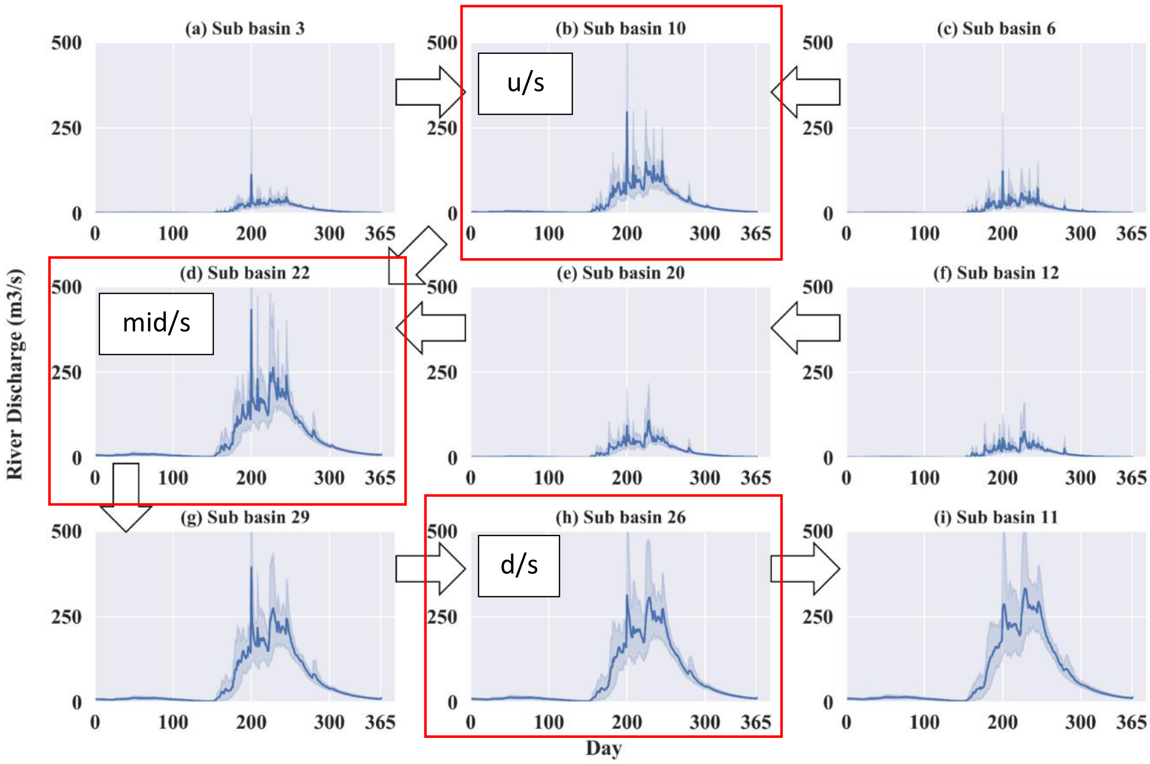
Under Climate Change



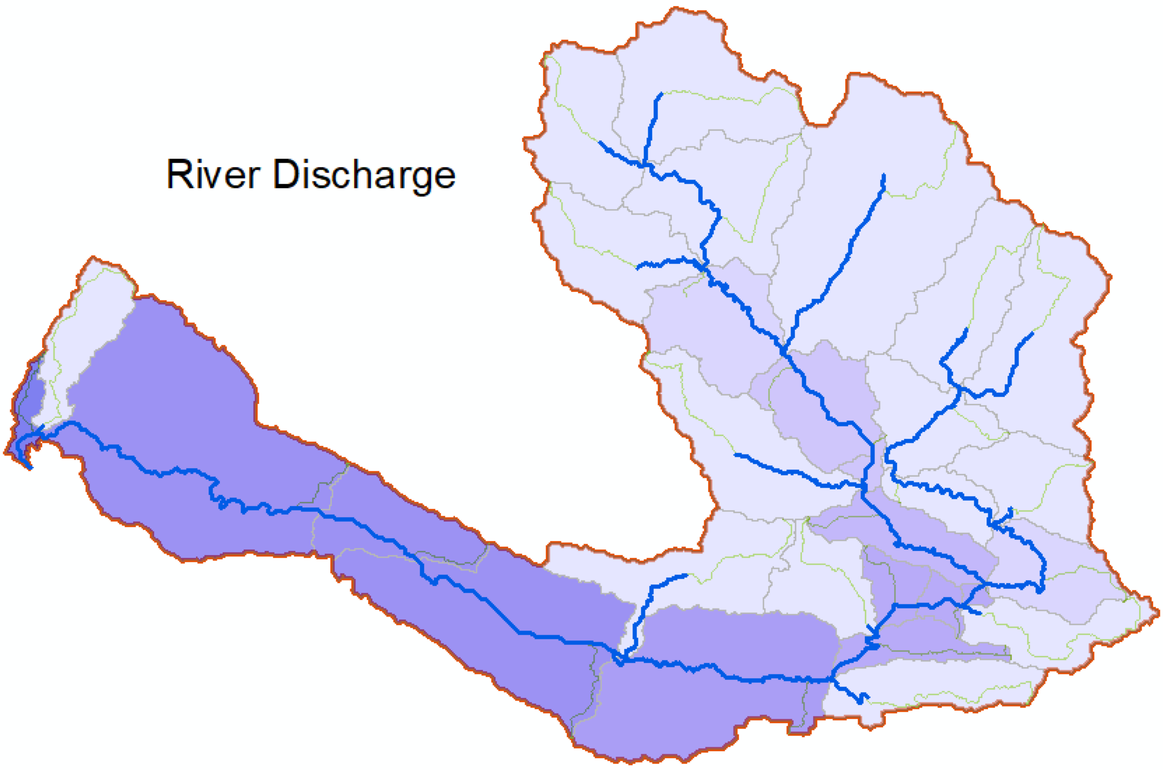
Annual precipitation and mean annual average temperature [Tavg = (Tmax + Tmin) / 2] under RCP 8.5 (figure not shown under RCP 4.5). Shaded regions represent ranges of selected five climate models and solid black lines represent mean values of selected climate models. Near future, NF: 2025 – 2049, Mid future, MF: 2050 – 2074, and Far future, FF: 2075 - 2099



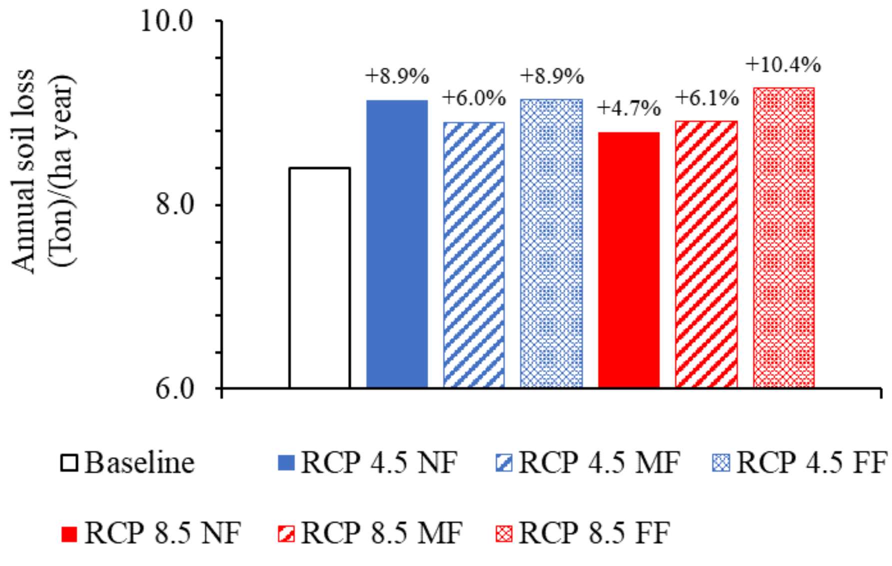
Mean annual discharge at upstream (u/s), midstream (mid/s), and downstream (d/s) under two warming scenarios (RCPs 4.5 and RCP 8.5). Near future, NF: 2025 – 2049, Mid future, MF: 2050 – 2074, and Far future, FF: 2075 – 2099



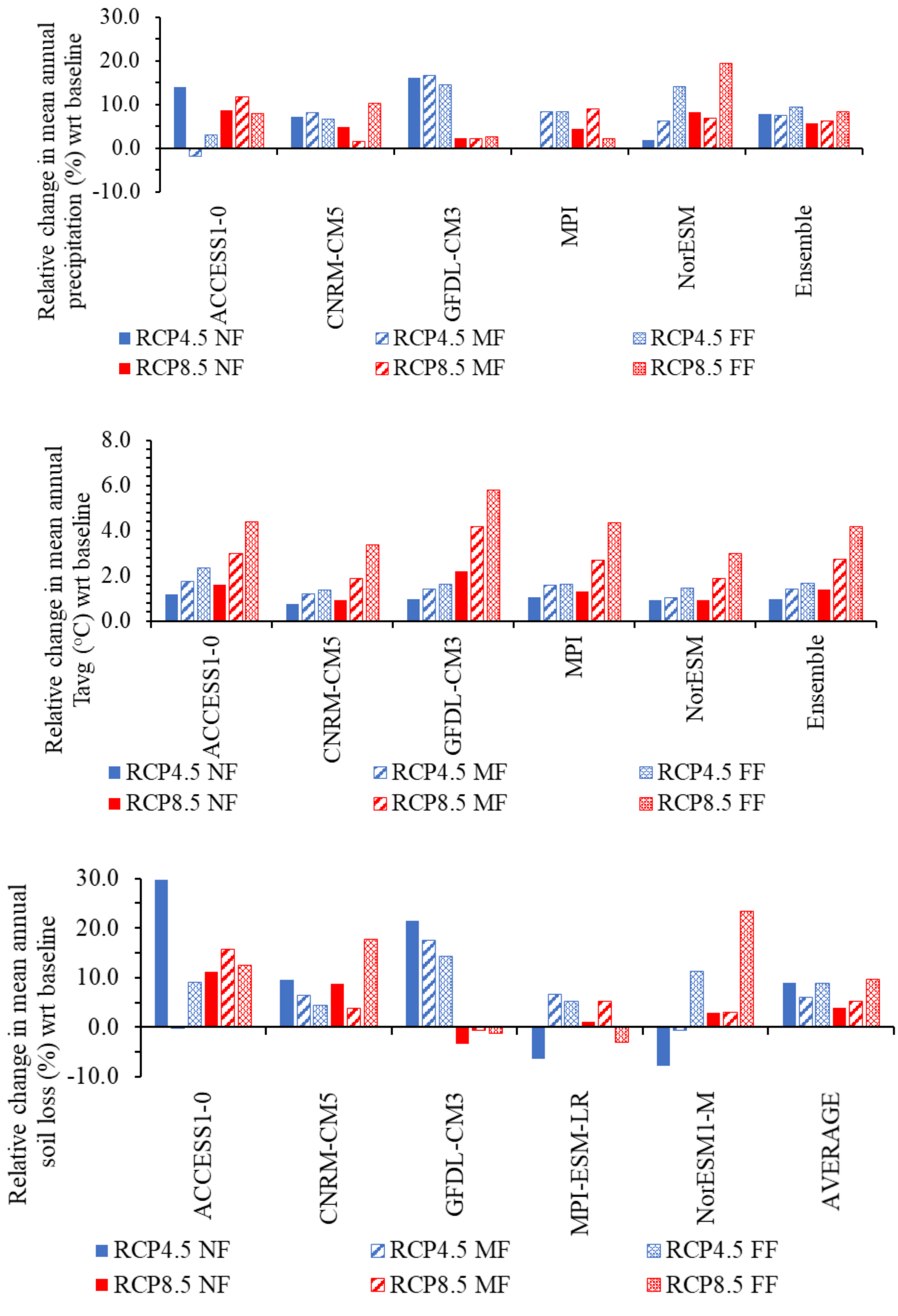
Intra annual variation of river discharge at selected sub-basins. Bands show inter annual variation for the period of 2003 – 2015. Three sub-basins enclosed by red boxes are hydrological gauging stations at upstream, midstream and downstream. These three stations are used for calibration and validation of the model and their locations are shown in first figure. Sub basin 11 at the most downstream is the location at Nepal-India border.



Spatial distribution of sub-basin averaged river discharge across the study area.



Anticipated mean annual soil loss for different time periods including the baseline (2003 – 2015) and future scenarios under two warming scenarios (RCPs 4.5 and 8.5) across the study area based on ensemble of selected climate models. Label expressed in % is anticipated change of mean annual soil loss with respect to the baseline. Near future, NF: 2025 – 2049, Mid future, MF: 2050 – 2074, and Far future, FF: 2075 – 2099



Anticipated changes in mean annual precipitation (at top panel) expressed in %, mean annual temperature (at middle panel) expressed in °C, and mean annual soil loss (at bottom panel) expressed in % with respect to the baseline (2003 - 2015) under two warming scenarios (RCPs 4.5 and 8.5) across the study area for different climate models and ensemble of selected climate models. Near future, NF: 2025 – 2049, Mid future, MF: 2050 – 2074, and Far future, FF: 2075 – 2099