* Forecast reconciliation in the probabilistic setting is rigorously developed.
* Point forecast reconciliation is extended in a novel way to the probabilistic setting.
* Results are derived for the Gaussian and non-Gaussian case.
* Theorems on scoring rules are derived with recommendations for forecast evaluation.
* A new reconciliation method based on score optimisation and stochastic gradient descent is proposed.
* The new methods are shown to improve forecast accuracy in a simulated and empirical setting.