

Sampling Protocols and Input Dimensionality Clarification

Purpose of this document.

This document provides a clear and self-contained explanation of how different temporal sampling protocols and measurement representations translate into input dimensionality for a learning-based rainfall estimation model using commercial microwave link (CML) measurements.

The CML data considered here are sampled at a temporal resolution of 10 seconds. As a result, a 15-minute interval corresponds to 900 seconds and contains 90 received signal level (RSL) samples and 90 transmitted signal level (TSL) samples. Depending on the chosen sampling protocol; min-max, mean, or instantaneous and the associated sampling interval, these raw measurements are aggregated or selected differently, leading to different input dimensionalities.

The table below summarizes the input dimensionality associated with each sampling protocol and sampling interval, based on the number of RSL and TSL values provided to the model per 15-minute window.

Measurement Type	Sampling interval [sec]	Input dimension size
Min - Max	900	4 (Max RSL, Min RSL, Max TSL, Min TSL)
Mean	900	2 (avg RSL, avg TSL)
Instantaneous	900	2 (1 RSL, 1 TSL)
Instantaneous	450	4 (2 RSL, 2 TSL)
Instantaneous	300	6 (3 RSL, 3 TSL)
Instantaneous	180	10 (5 RSL, 5 TSL)
Instantaneous	150	12 (6 RSL, 6 TSL)
Instantaneous	100	18 (9 RSL, 9 TSL)
Instantaneous	90	20 (10 RSL, 10 TSL)
Instantaneous	60	30 (15 RSL, 15 TSL)
Instantaneous	50	36 (18 RSL, 18 TSL)
Instantaneous	30	60 (30 RSL, 30 TSL)
Instantaneous	20	90 (45 RSL, 45 TSL)
Instantaneous	10	180 (90 RSL, 90 TSL)

This document is intended solely as a technical clarification to facilitate correct interpretation and reproducibility of the sampling configurations and their corresponding input dimensions.