

## Time Constants

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Question: *We have been using the PRR800 at 15hz sampling speed to record the shallow water variability in shallow coral reefs of Israel caused by wave lensing. We experimented in Australia with the PUV2500 at 20 hz and found very tight agreement between the modelled and actually wave lensing intensity measurements in the UV range of the spectrum. When we were working in Israel the fastest we could get the PRR800 in Israel to sample was at 15 hz. At 15 hz we are getting measurements every 66ms, but what would the integration time be for the sampling period as obviously there is some time in there where the data is being written off and not necessarily recording so I am guessing the integration time must be less than 66ms.*

Answer: The time constant in our radiometers is defined as the "RC time constant" ( [http://en.wikipedia.org/wiki/RC\\_time\\_constant](http://en.wikipedia.org/wiki/RC_time_constant)

). For both the PUV and PRR it is 50mS. The PRR800 is running slower as it has more channels to sample. The channels are being sampled by an analog to digital converter running a new conversion every 25uS. Channels are sampled in order within an instrument housing, and are sampled continuously with the result averaged until it is transmitted, and then a new average starts accumulates. So, an instrument with fewer channels will average more readings into a single report data frame than an instrument with more channels. There is buffering in the instrument so that when data is being transmitted, it is being sampled in the background for the next data frame to transmit. The maximum rate that an instrument will run is a function of the number of channels and number of instruments connected.