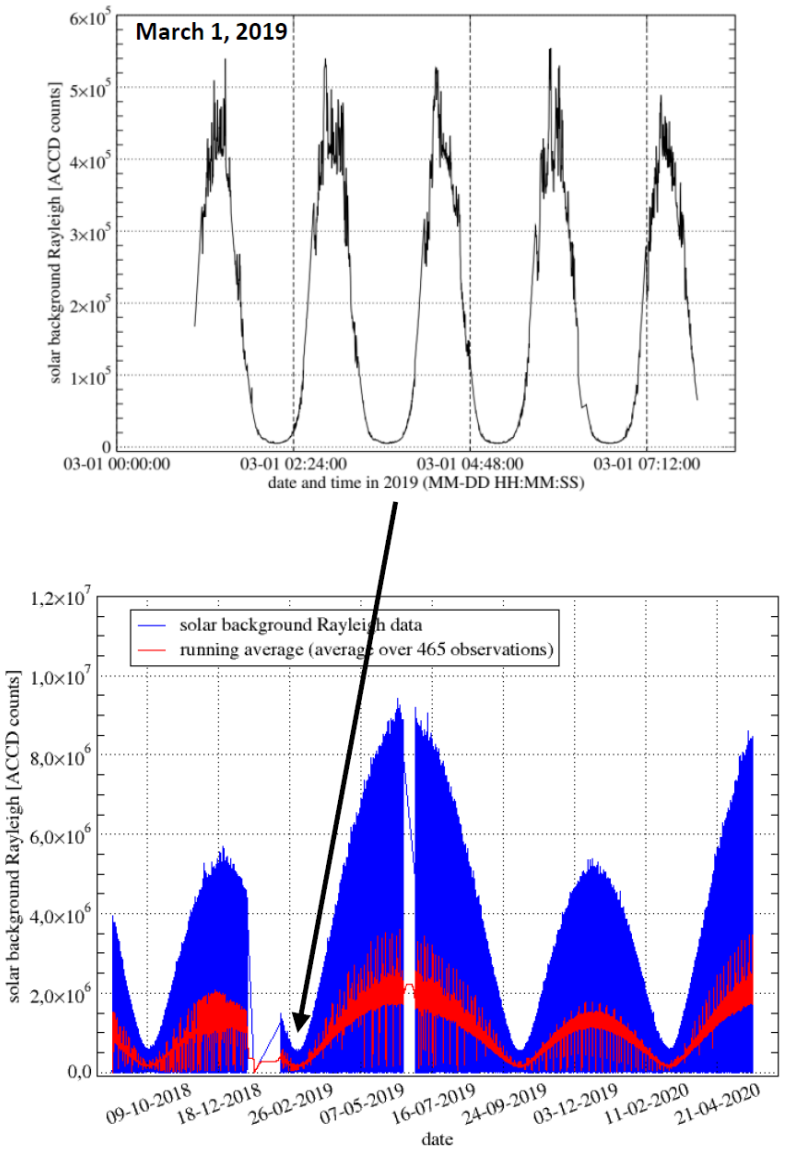
What drives the random errors?

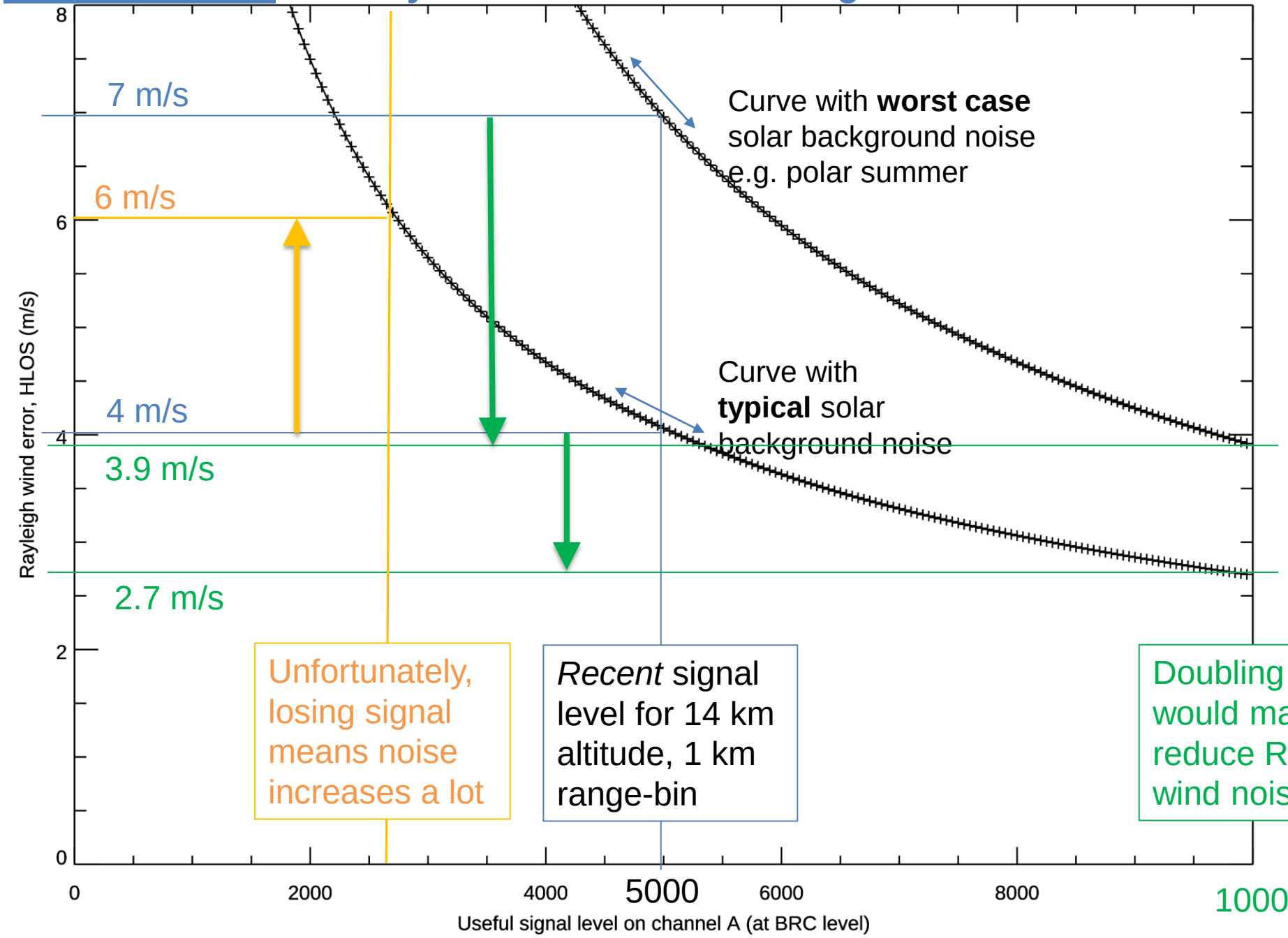
1. **Laser emit energy**
   - ⇨ Lower than expected (factor 1-2)
   - ⇨ Negative trend
2. **Optical signal throughput** in receive path for atmospheric signal
   - ⇨ Lower than expected (factor 2-3)
   - ⇨ Negative trend
3. **Solar background noise**
   - ⇨ Impact higher than expected due to lower atmospheric signal
   - ⇨ Seasonal variation of solar background by factor 18: Rayleigh random errors of 7-8 m/s were obtained in summer months for polar regions

Orbital variation of Rayleigh solar background noise



Figures by **K. Schmidt (DLR)**.

Rayleigh winds are very sensitive to solar background noise with current *low useful signal levels*



This is a simulation, but tuned to actual L2B Rayleigh-clear random errors found

Given our current useful signal **we have a lot to gain in wind random error** from more signal, particularly in polar summer conditions