TO WHICH PRECISION CAN WE CORRECT TELLURICS IN THE NIR?

Solène Ulmer-Moll
Pedro Figueira • Nuno Santos
TELLURIC ABSORPTION

Synthetic transmission spectrum of our atmosphere (LBLRTM/TAPAS)
Wavelength coverage of our CRIRES data set
MOLECFIT TELLURIC CORRECTION

CRIRES spectrum of a hot standard star in the J band. Residuals below 2%. Residual patterns could be removed with PCA.
OFFSET AND SCATTER
TELLURIC CORRECTION METHODS

Residuals inside the water telluric lines for Molecfit, TelFit, TAPAS, and the standard star method around 1.18 microns.
SCATTER EVOLUTION with AIRMASS and RELATIVE HUMIDITY

Airmass vs. Standard deviation

- SNR = 300
- SNR = 800

Relative humidity (%)
COMPARISON TELLURIC CORRECTIONS

Residuals inside the telluric lines in the wavelength range dominated by oxygen absorption.
Merged profile: EMM + GDAS + averaged profile

Equatorial profile: yearly averaged atmospheric profile

Equatorial profile updated: profile updated with humidity values from a first telluric correction
WATER COLUMN RESULTS

All atmospheric profiles lead to water column values which are in agreement within the error bars.
CONCLUSIONS

- Water lines: synthetic transmission methods correct best scatter is 1.3 times higher with the standard star

- Oxygen lines: standard star method corrects best scatter is 1.2 times smaller with the standard star Molecfit has a comparable level of correction

- Use of tailored atmospheric profile improves the correction level scatter 2 times smaller