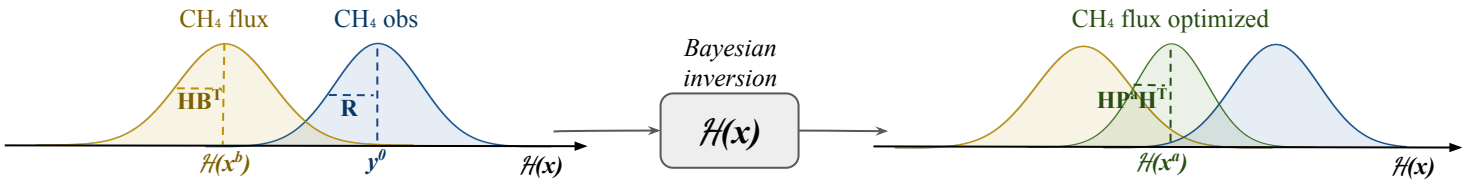
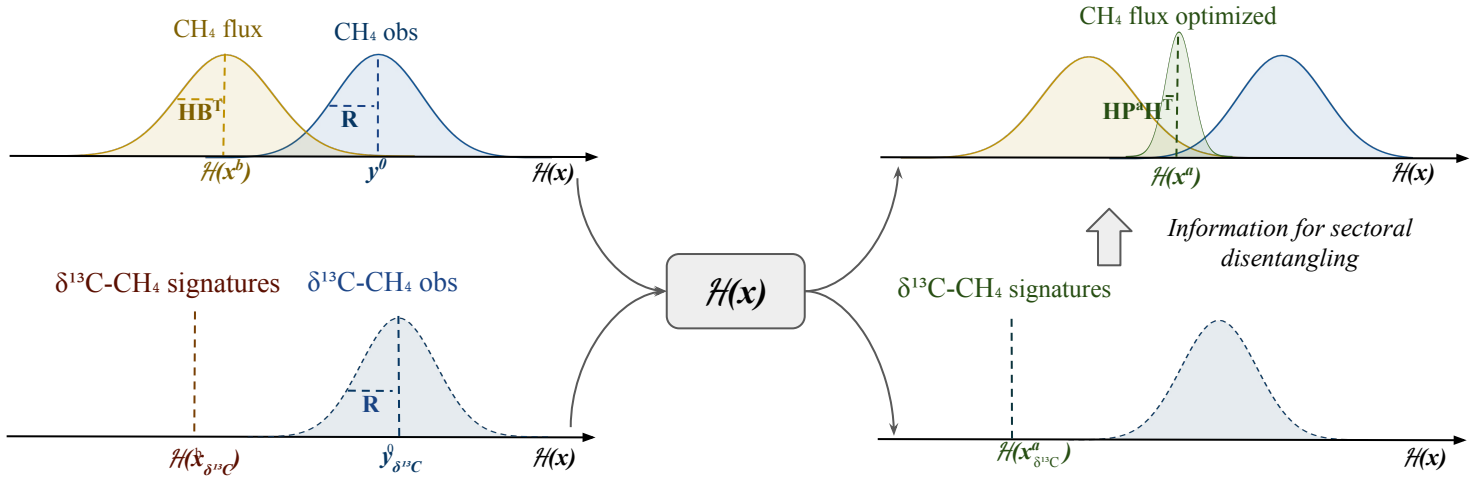
CH_4 only



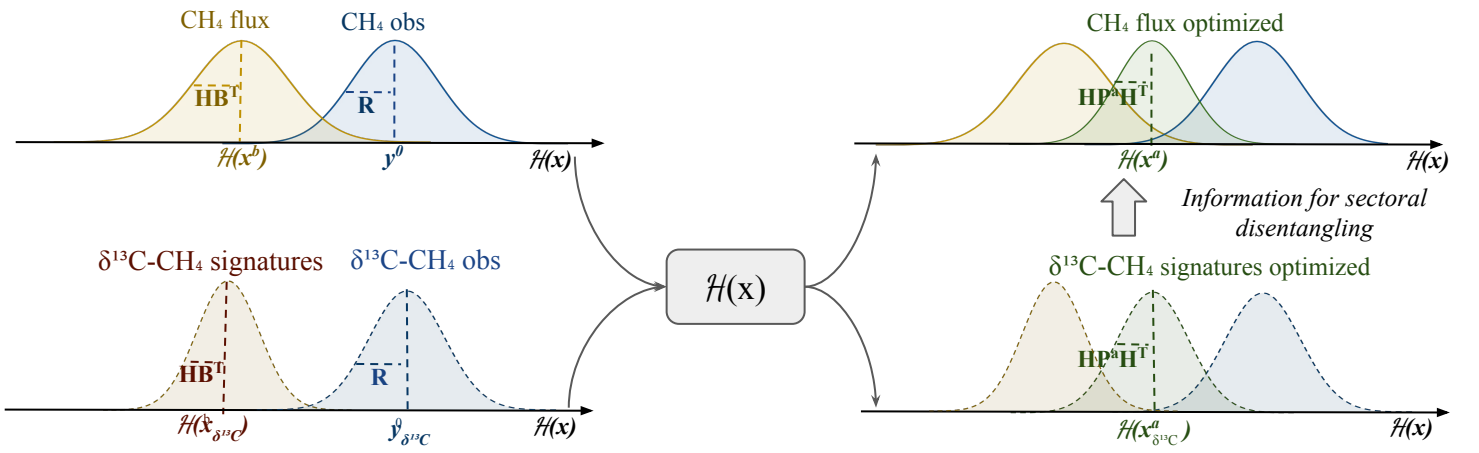
⇒ Difficulty to disentangle co-located emissions

CH_4 + $\delta^{13}C$-CH_4 fixed



⇒ No $\delta^{13}C$-CH_4 uncertainty (**B=0**) → strong constraint, potential bias if signatures are mis-specified

CH_4 + $\delta^{13}C$-CH_4 optimized



⇒ Realistic **B** and **R** required → highly **sensitive to B/R balance,** risk of no effective constraint

The effectiveness of $\delta^{13}C$-CH_4 constraint depends on how isotopes uncertainties are represented.