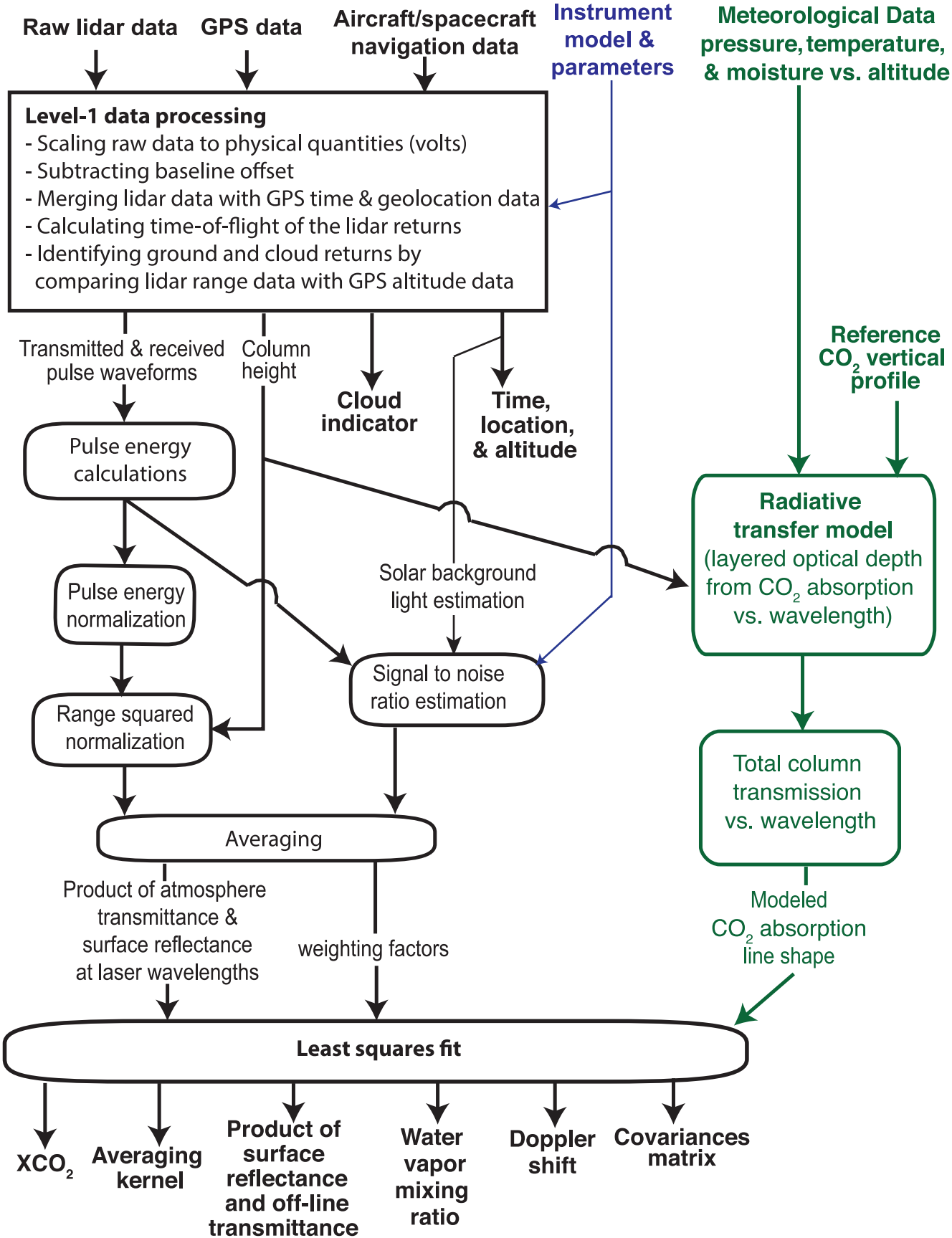
Raw lidar data
GPS data
Aircraft/spacecraft navigation data
Instrument model & parameters
Meteorological Data pressure, temperature, & moisture vs. altitude
Level-1 data processing
- Scaling raw data to physical quantities (volts)
- Subtracting baseline offset
- Merging lidar data with GPS time & geolocation data
- Calculating time-of-flight of the lidar returns
- Identifying ground and cloud returns by comparing lidar range data with GPS altitude data
Transmitted & received pulse waveforms
Column height
Cloud indicator
Time, location, & altitude
Reference CO_2 vertical profile
Pulse energy calculations
Radiative transfer model (layered optical depth from CO_2 absorption vs. wavelength)
Pulse energy normalization
Solar background light estimation
Signal to noise ratio estimation
Range squared normalization
Total column transmission vs. wavelength
Averaging
Product of atmosphere transmittance & surface reflectance at laser wavelengths
weighting factors
Modeled CO_2 absorption line shape
Least squares fit
XCO_2
Averaging kernel
Product of surface reflectance and off-line transmittance
Water vapor mixing ratio
Doppler shift
Covariances matrix