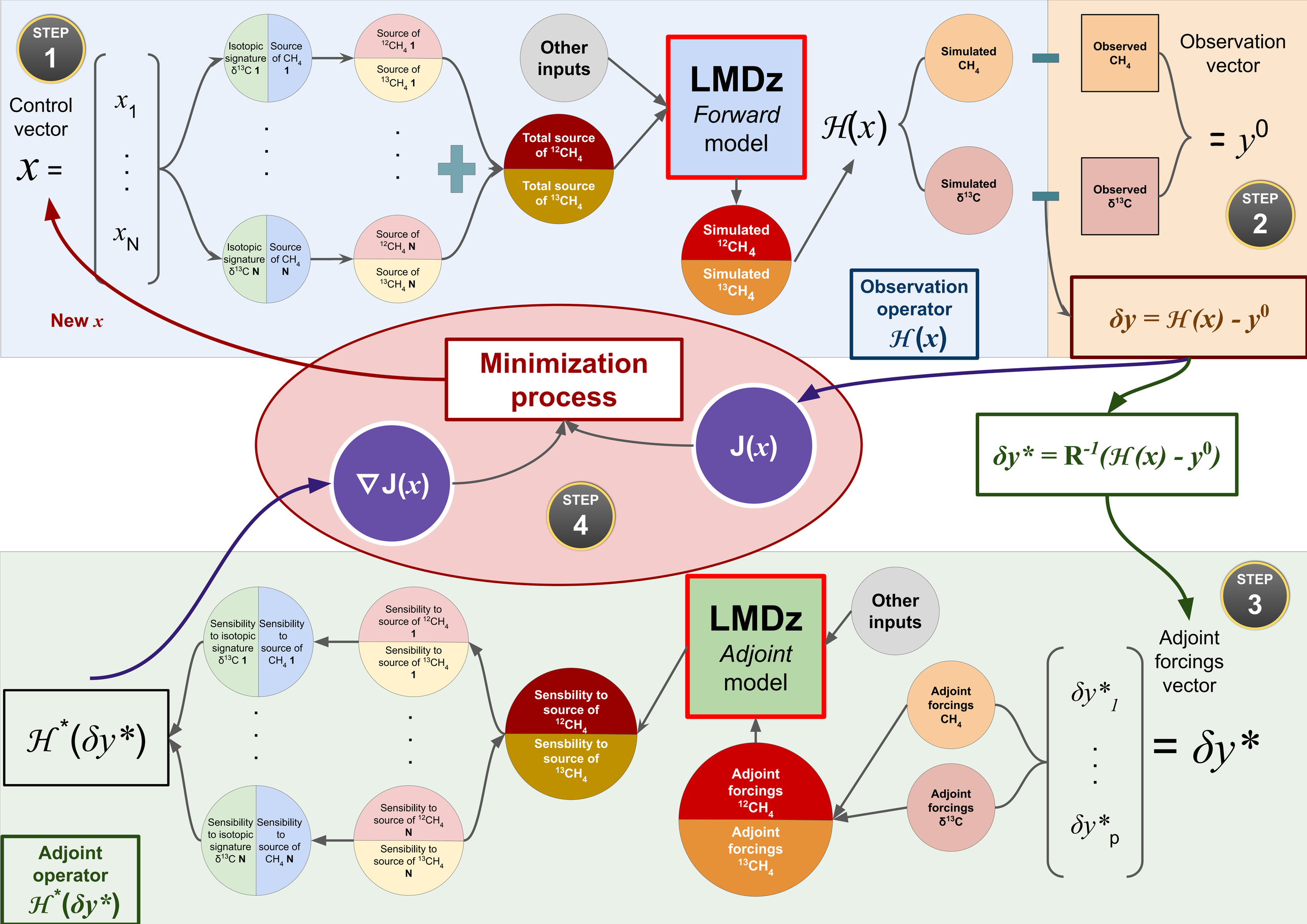
STEP 1
Control vector
$x =$
x_1
x_N
Isotopic signature $\delta^{13}C$ 1
Source of CH_4 1
Source of $^{12}CH_4$ 1
Source of $^{13}CH_4$ 1
Isotopic signature $\delta^{13}C$ N
Source of CH_4 N
Source of $^{12}CH_4$ N
Source of $^{13}CH_4$ N
Other inputs
Total source of $^{12}CH_4$
Total source of $^{13}CH_4$
LMDz
Forward model
Simulated $^{12}CH_4$
Simulated $^{13}CH_4$
$\mathcal{H}(x)$
Simulated CH_4
Simulated $\delta^{13}C$
Observation operator
$\mathcal{H}(x)$
Observed CH_4
Observed $\delta^{13}C$
Observation vector
$= y^0$
STEP 2
$\delta y = \mathcal{H}(x) - y^0$
New x
Minimization process
$\nabla J(x)$
$J(x)$
STEP 4
$\delta y^* = R^{-1}(\mathcal{H}(x) - y^0)$
STEP 3
Adjoint forcings vector
δy^*_1
δy^*_p
$= \delta y^*$
Adjoint forcings CH_4
Adjoint forcings $\delta^{13}C$
Adjoint forcings $^{12}CH_4$
Adjoint forcings $^{13}CH_4$
LMDz
Adjoint model
Other inputs
Sensbility to source of $^{12}CH_4$
Sensbility to source of $^{13}CH_4$
Sensibility to source of $^{12}CH_4$ 1
Sensibility to source of $^{13}CH_4$ 1
Sensibility to isotopic signature $\delta^{13}C$ 1
Sensibility to source of CH_4 1
Sensibility to source of $^{12}CH_4$ N
Sensibility to source of $^{13}CH_4$ N
Sensibility to isotopic signature $\delta^{13}C$ N
Sensibility to source of CH_4 N
$\mathcal{H}^*(\delta y^*)$
Adjoint operator
$\mathcal{H}^*(\delta y^*)$