*Not to scale

$\{X^*, E_m^*\}$

$\{X, E_m^{sh}\}$

Solar wind

L1

Wind

$t_1 + dt_1$

Magnetosheath

$t_2 + dt_2 + \varepsilon$

$\{Y\}^{o,m}$

THEMIS,
MMS, Geotail,
Cluster, ISEE-1/2

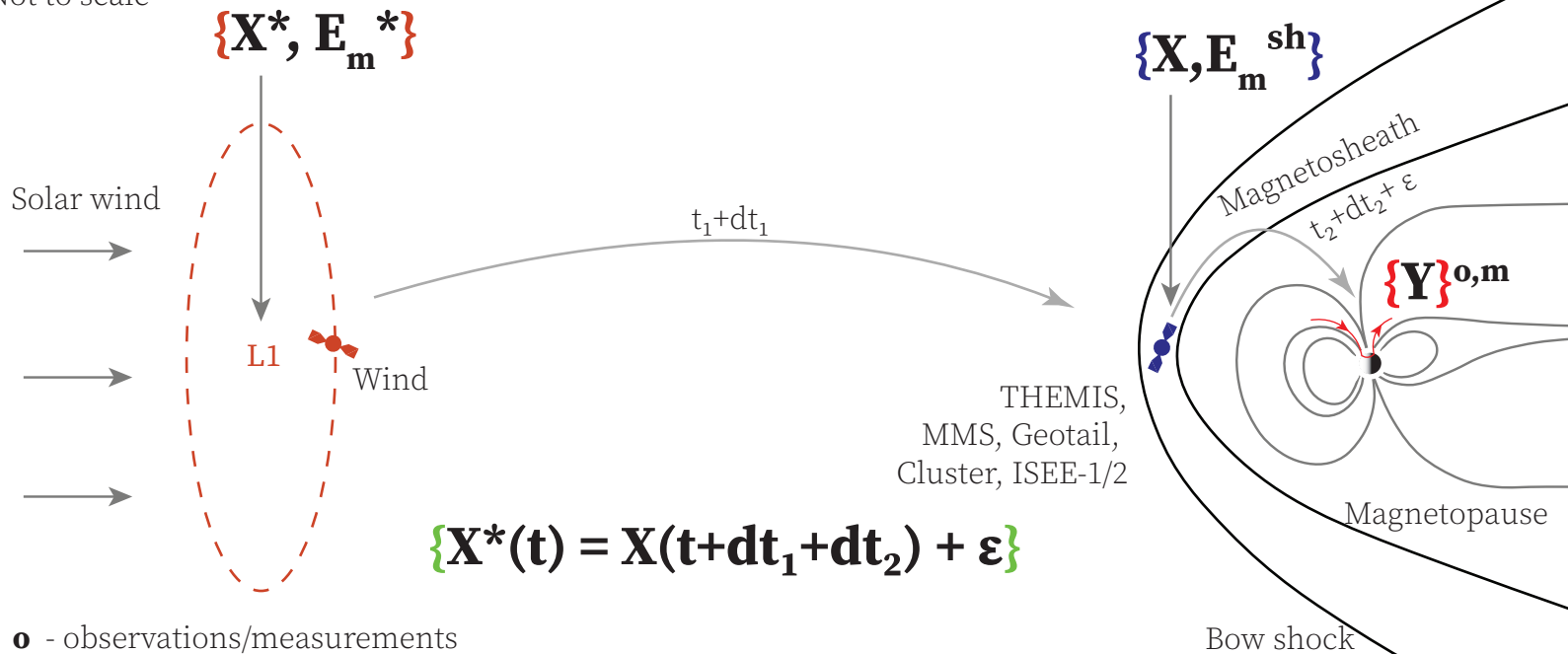Magnetopause

$$\{X^*(t) = X(t + dt_1 + dt_2) + \varepsilon\}$$

Bow shock

o - observations/measurements
m - error model input/output
X :- solar wind driver (**o**:E_m^* **m**: X^*), shocked solar wind driver (**o**:E_m^{sh} **m**: X)
Y :- polar cap index (**o**:PCI ~ E_{PC} **m**: Y_{PC}) auroral electrojet strength(**o**:SML **m**: Y_{SML})
L1 - First Lagrange point
t1 :- solar wind propagation delay from L1 to Nose, estimated by OMNI
dt1 :- uncertainty in the above delay estimate
t2 :- propagation delay within magnetosheath from nose to the ionosphere
dt2 :- uncertainty in the above delay estimate
ε :- magnitude uncertainty caused by plasma processes in the magnetosheath