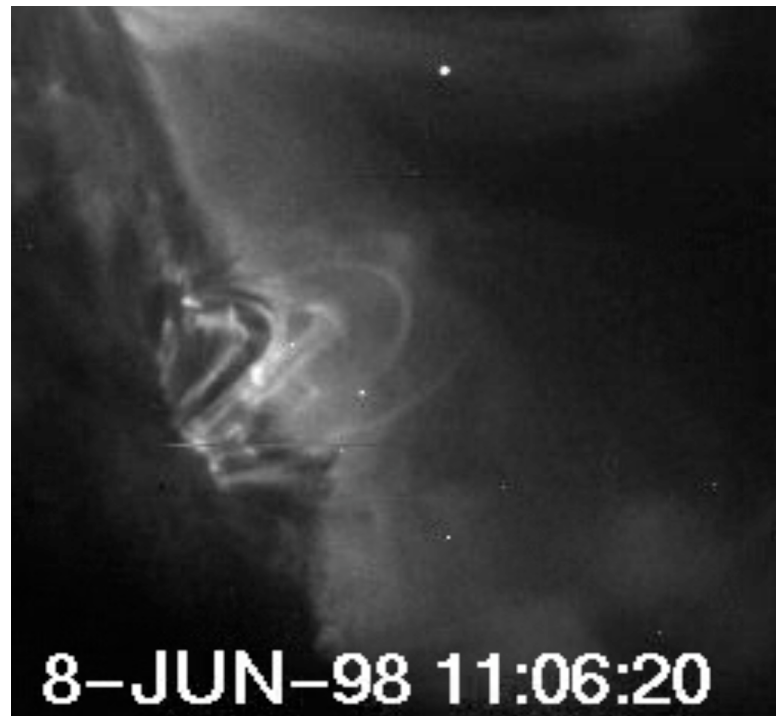
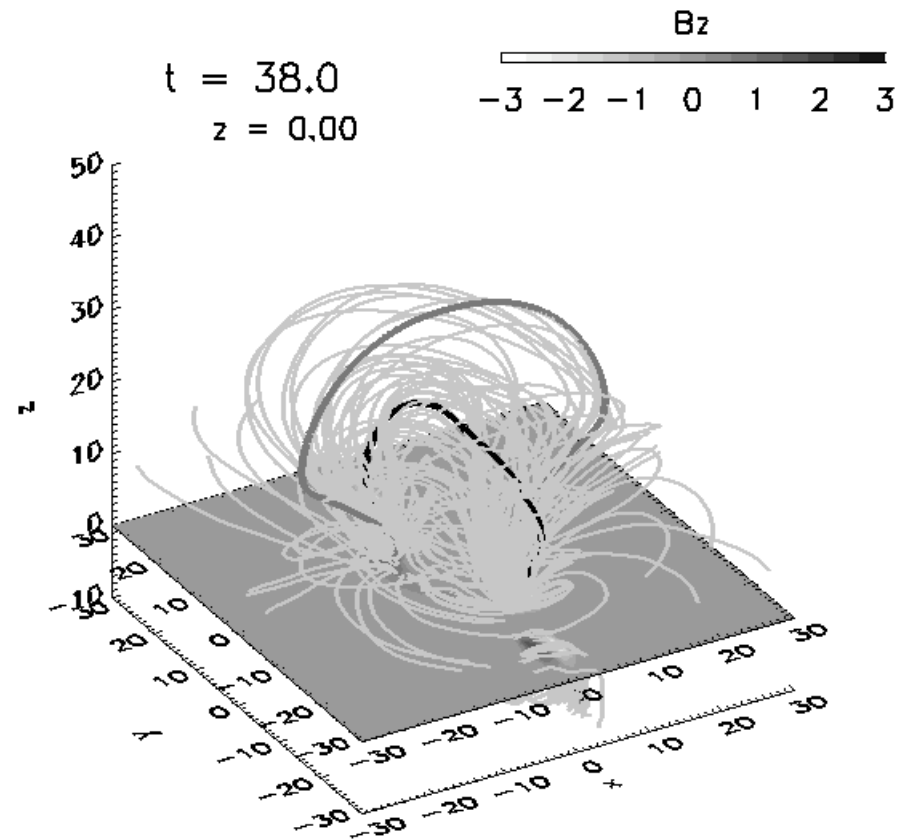


Flux emergence... a very dynamic process (observation)



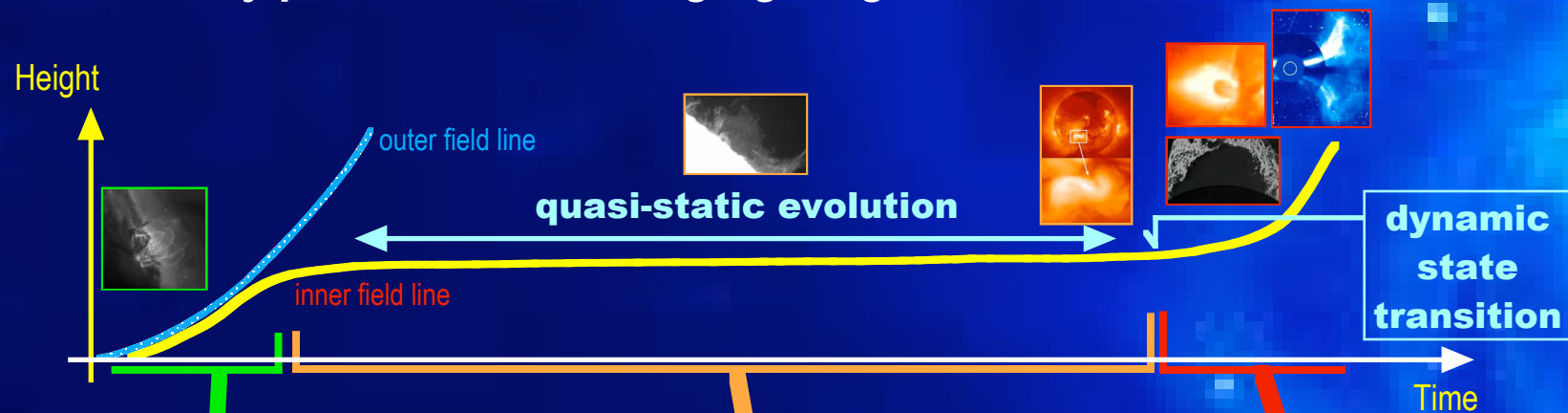
Observed by ***TRACE***

Flux emergence... a very dynamic process (simulation)



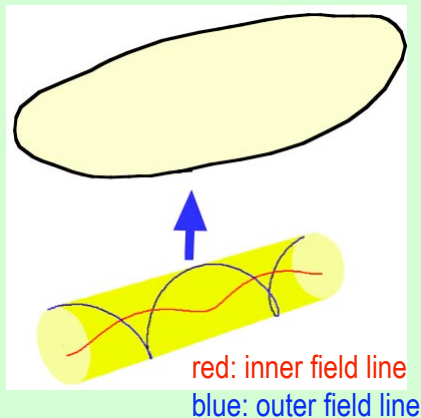
Magara (2004)

Evolutionary phases of an emerging magnetic field



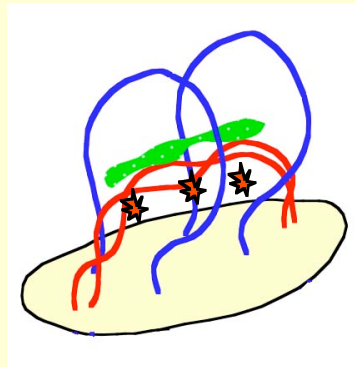
Emergence phase:

Emergence of subsurface magnetic field in a **twisted flux-tube shape**



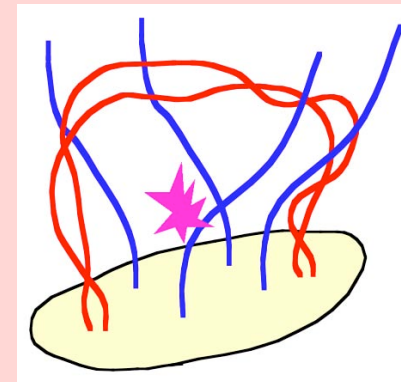
Formation phase:

Formation of magnetic structure called **flux rope** in the solar corona (**prominence /filament, sigmoid, small-scale flaring events** are observed)

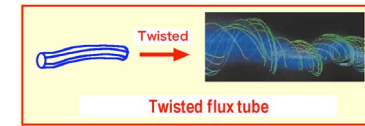


Eruption phase:

Eruption of flux rope toward the interplanetary space (sometimes accompanied by **flare with plasmoid ejection**)



Twisted flux tube plays an important role in magnetic activity observed in the solar atmosphere...



Because it contains **field-aligned current** giving free magnetic energy that is not consumed to drive expansion via Lorentz force.

