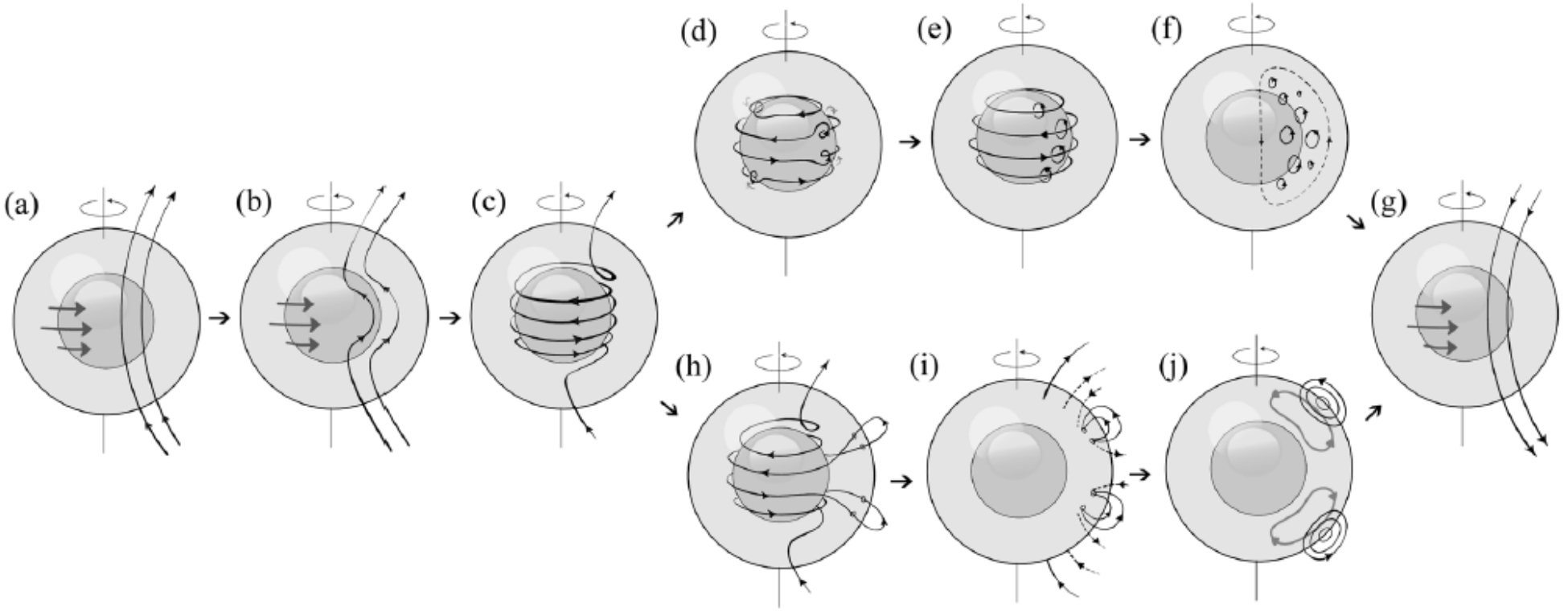
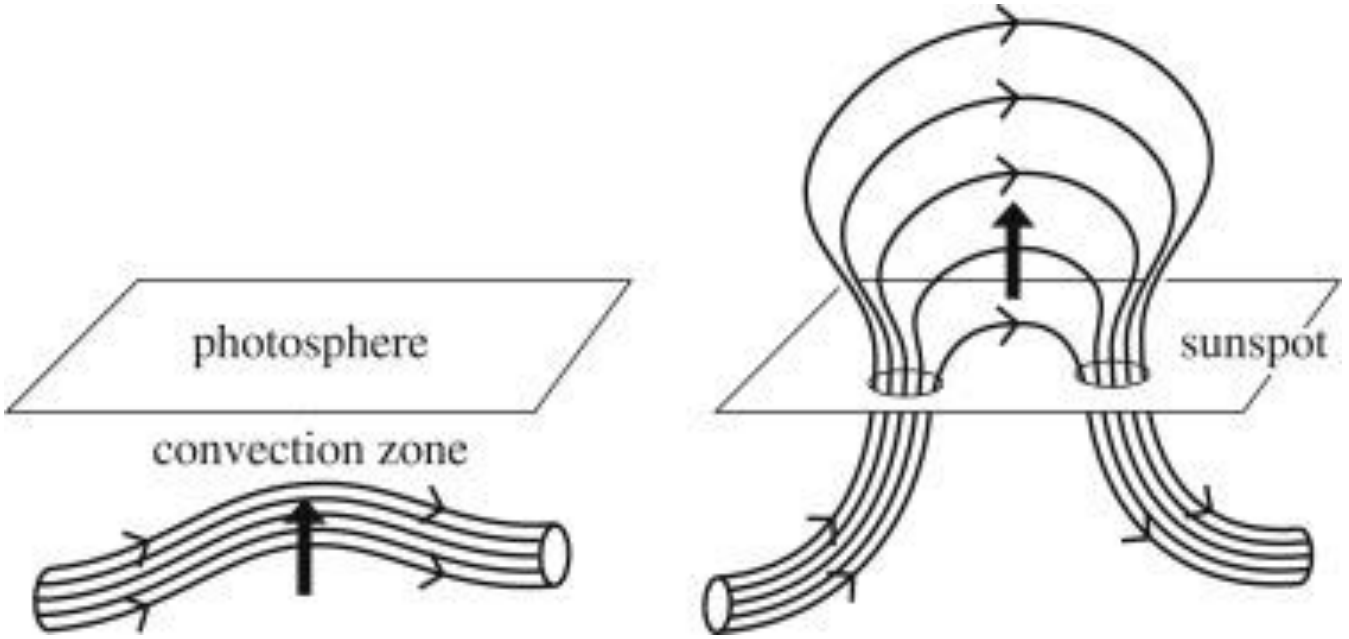
Всплытие магнитного потока на поверхность Солнца

Куценко А.С., Абраменко В.И.

Крымская астрофизическая обсерватория РАН

Научный, Крым, Россия


(a)
(b)
(c)
(d)
(e)
(f)
(g)
(h)
(i)
(j)


photosphere
convection zone
sunspot

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Statistical Study on the Nature of Solar-Flux Emergence

Kenichi OTSUJI,[1,2] Reizaburo KITAI,[2] Kiyoshi ICHIMOTO,[2] and Kazunari SHIBATA[2]
[1]*National Astronomical Observatory of Japan, 2-21-1 Mitaka, Tokyo 181-8588*
otsuji@solar.mtk.nao.ac.jp
[2]*Kwasan and Hida Observatories, Kyoto University, Yamashina-ku, Kyoto 607-8741*

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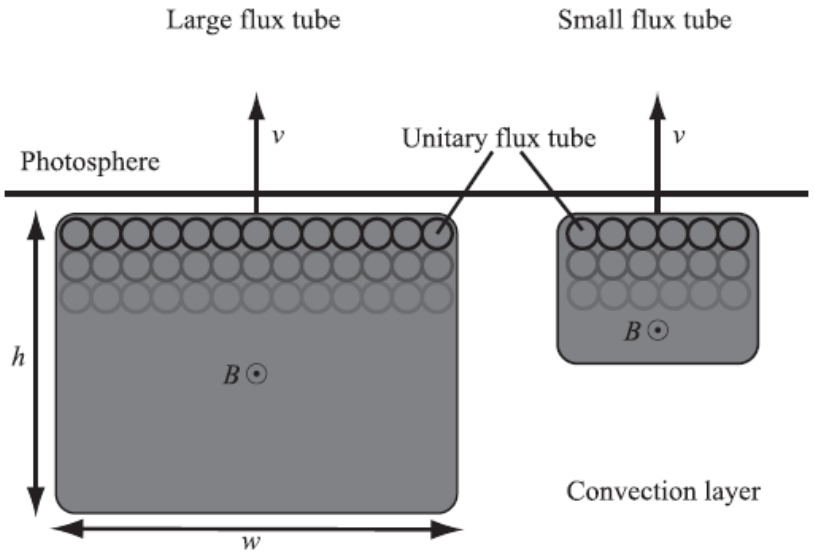

Fig. 7. Schematic image of a flux tube underneath the solar photosphere. The gray areas represent the cross-section of flux tubes with a field strength of B; w and h are the horizontal and vertical width of the flux tube, respectively; v is the rise velocity of the flux tubes at the photosphere. Small circles in the flux tube represent unitary and elementary flux tubes described in sub-subsection 4.3.2.

$$\langle d\Phi/dt \rangle \propto \Phi_{\max}^{\frac{1}{2}}$$

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Emergence of Magnetic Flux Generated in a Solar Convective Dynamo. I. The Formation of Sunspots and Active Regions, and The Origin of Their Asymmetries

Feng Chen, Matthias Rempel, and Yuhong Fan
High Altitude Observatory, NCAR, P.O. Box 3000, Boulder, CO, 80307, USA; chenfeng@ucar.edu
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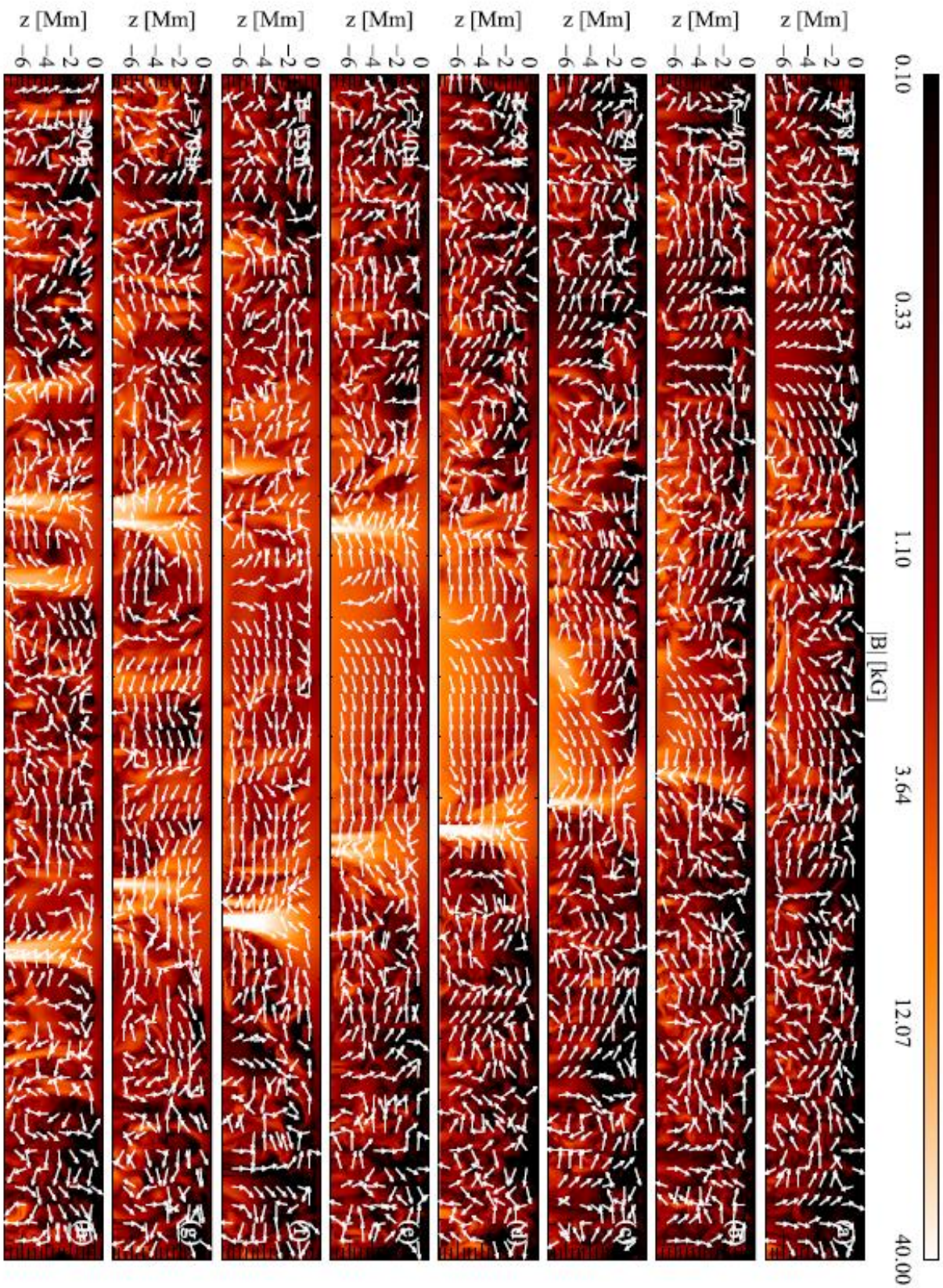


Figure 7. Magnetic field strength ($|\boldsymbol{B}|$) in a vertical slice (x–z plane) through the center of the domain ($y = 49$ Mm in the 98×8 run). Time stamps are identical to those in Figure 4. Arrows show the normalized v_x and v_z in the x–z slice. Note that the length of the arrows doest not correspond the speed of the flow. (An animation of this figure is available.)

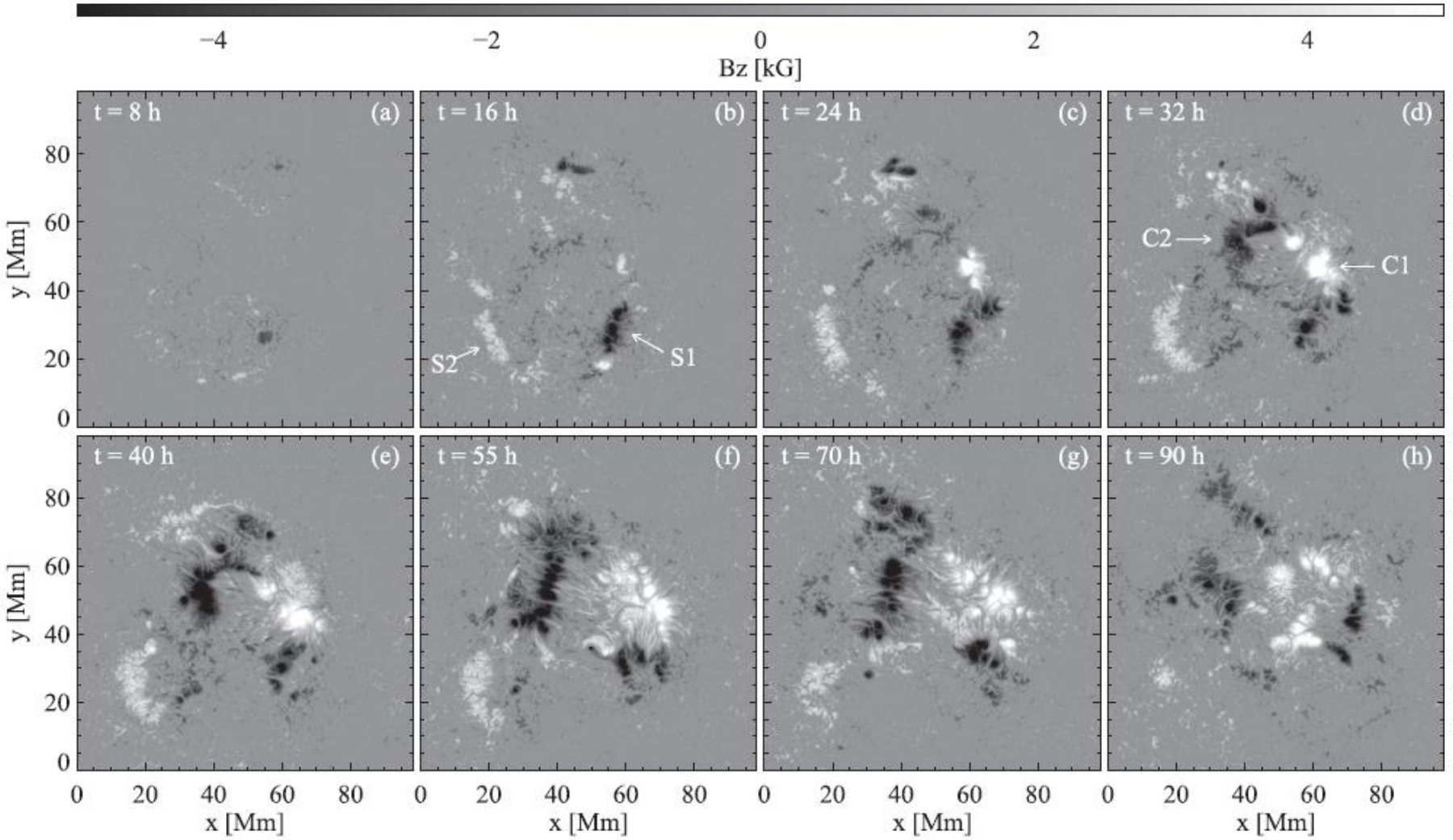
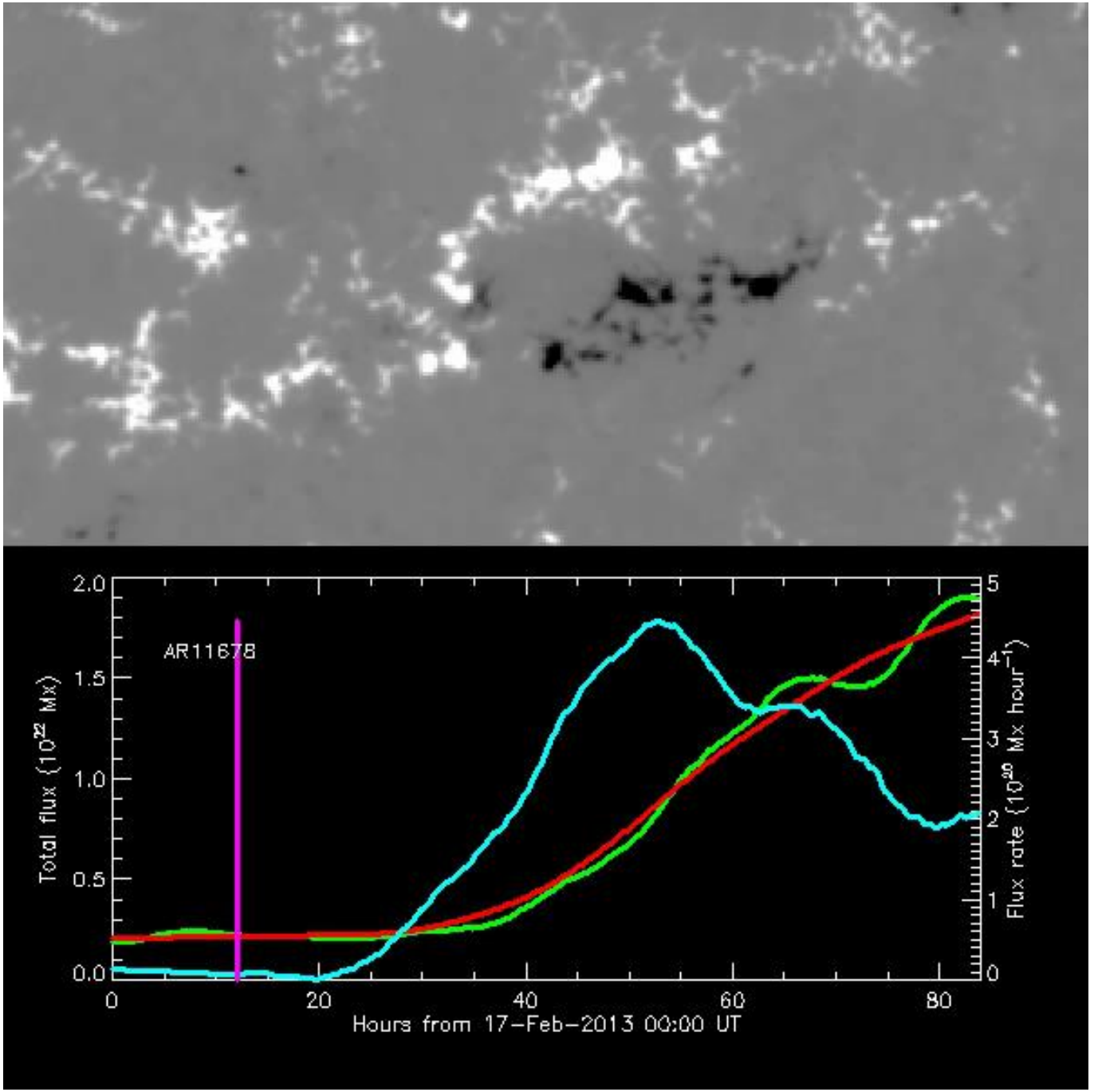


Figure 4. Vertical magnetic field at the $\tau = 1$ layer showing the evolution of active regions in about four days. This can be compared with magnetograms from observations.

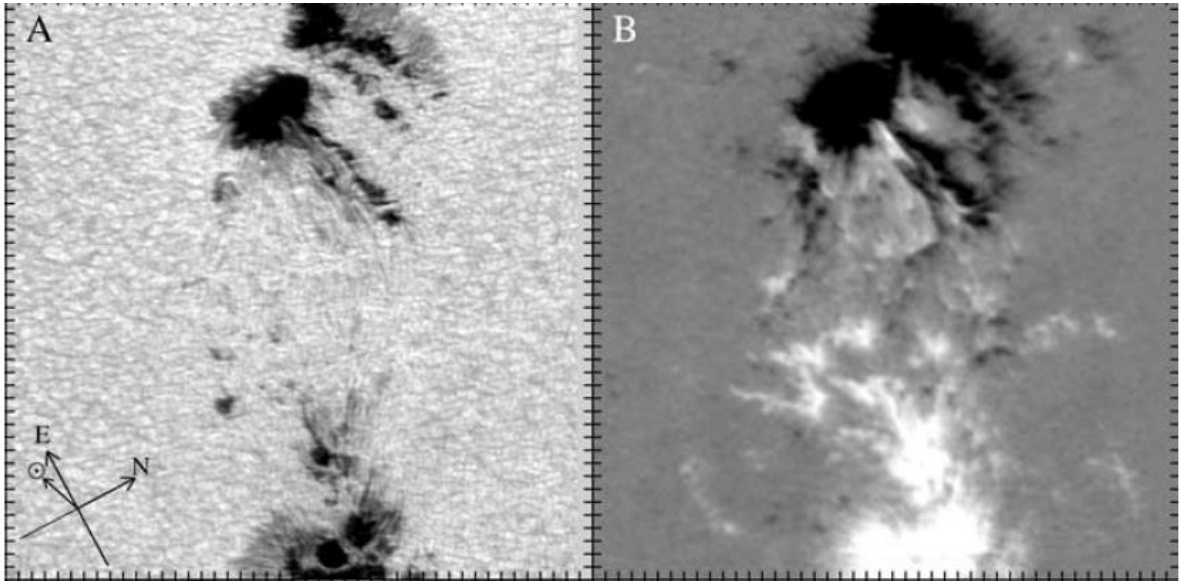
(An animation of this figure is available.)


AR11678
Total flux (10^{22} Mx)
Flux rate (10^{20} Mx hour^{-1})
Hours from 17-Feb-2013 00:00 UT
0.0
0.5
1.0
1.5
2.0
0
1
2
3
4
5
0
20
40
60
80

MOVING DIPOLAR FEATURES IN AN EMERGING FLUX REGION

Solar Physics **209:** 119–139, 2002.

P. N. BERNASCONI, D. M. RUST, M. K. GEORGOULIS and B. J. LABONTE
JHU / Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723-6099, U.S.A.



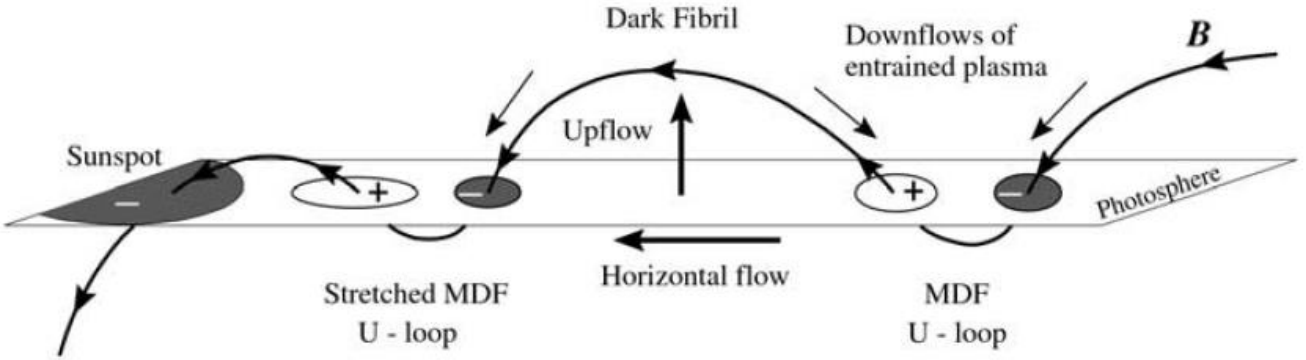
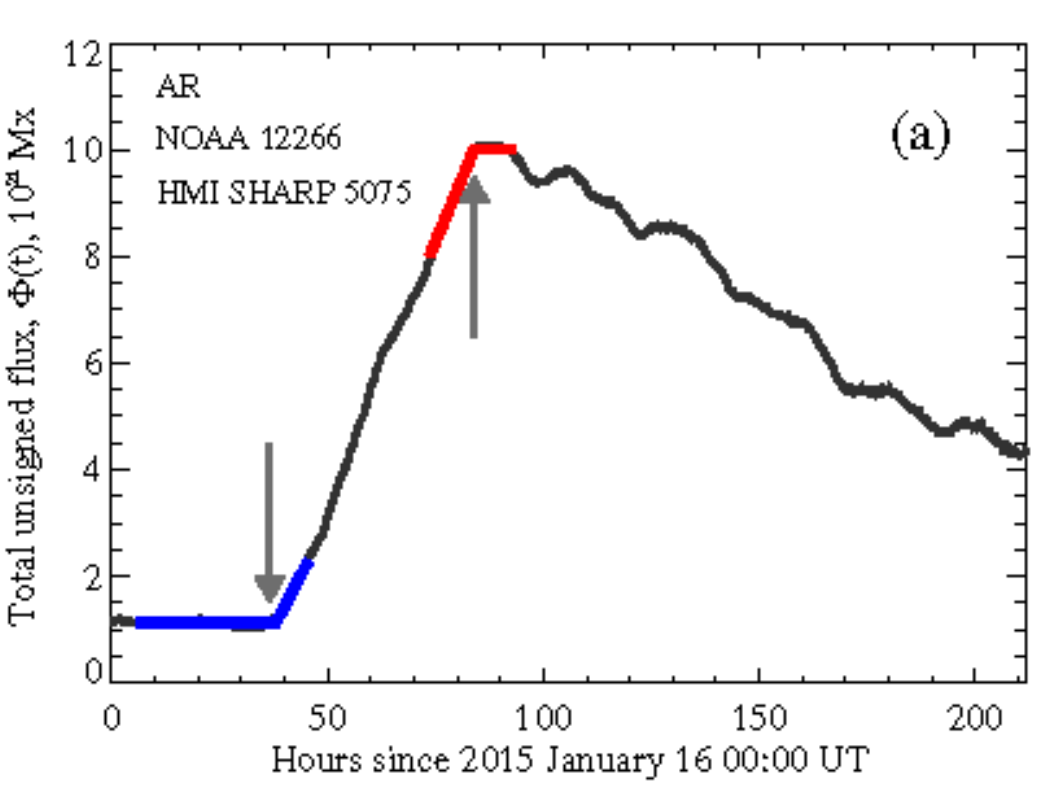
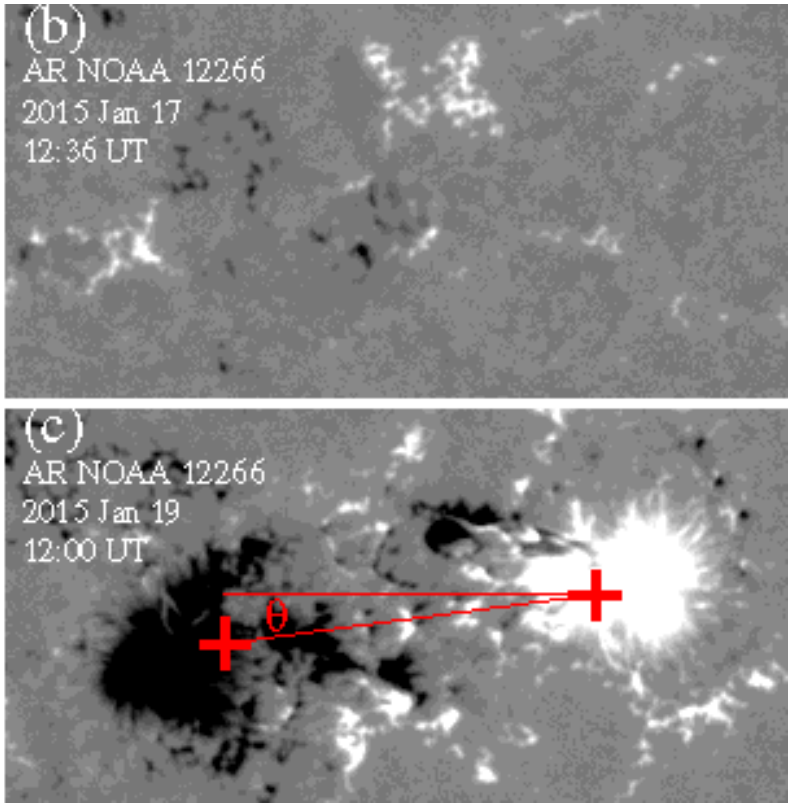
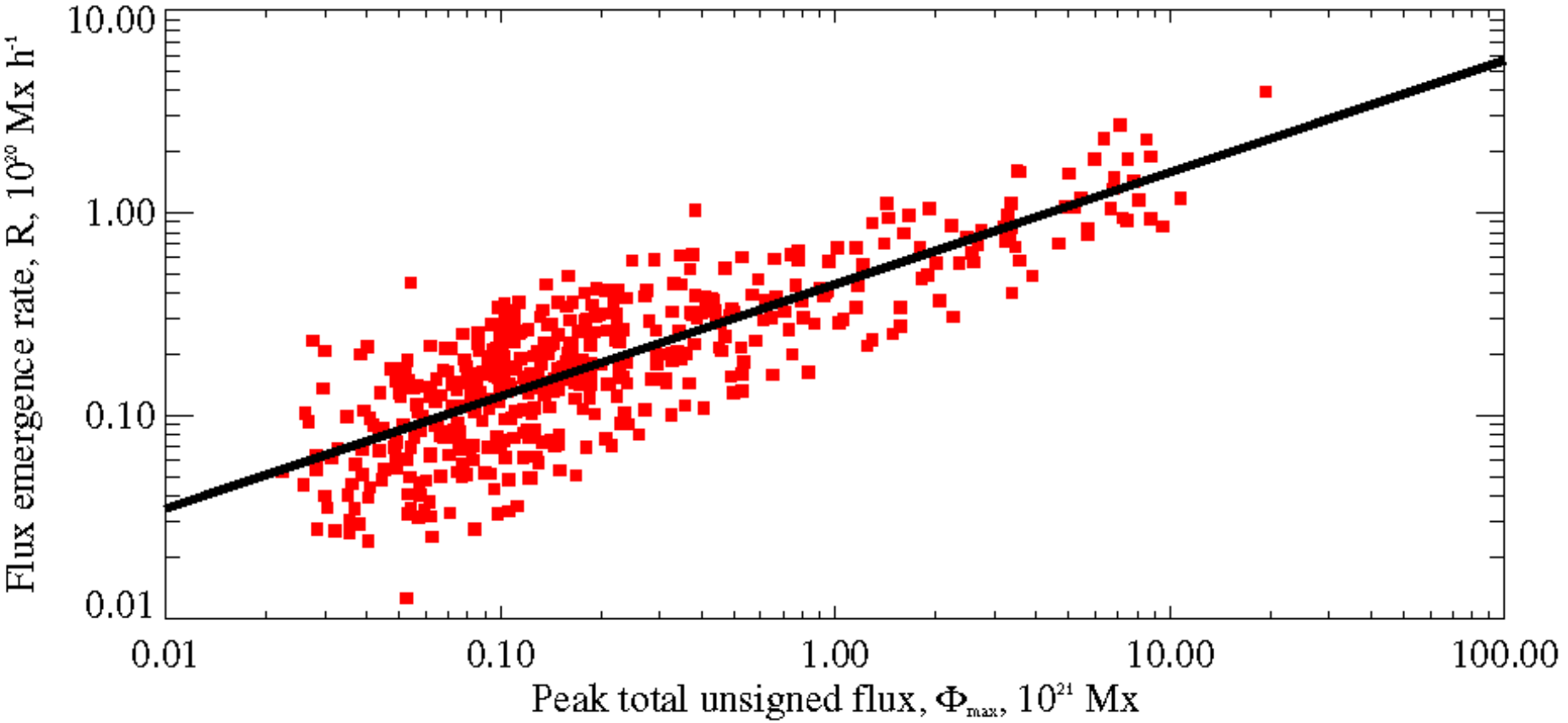
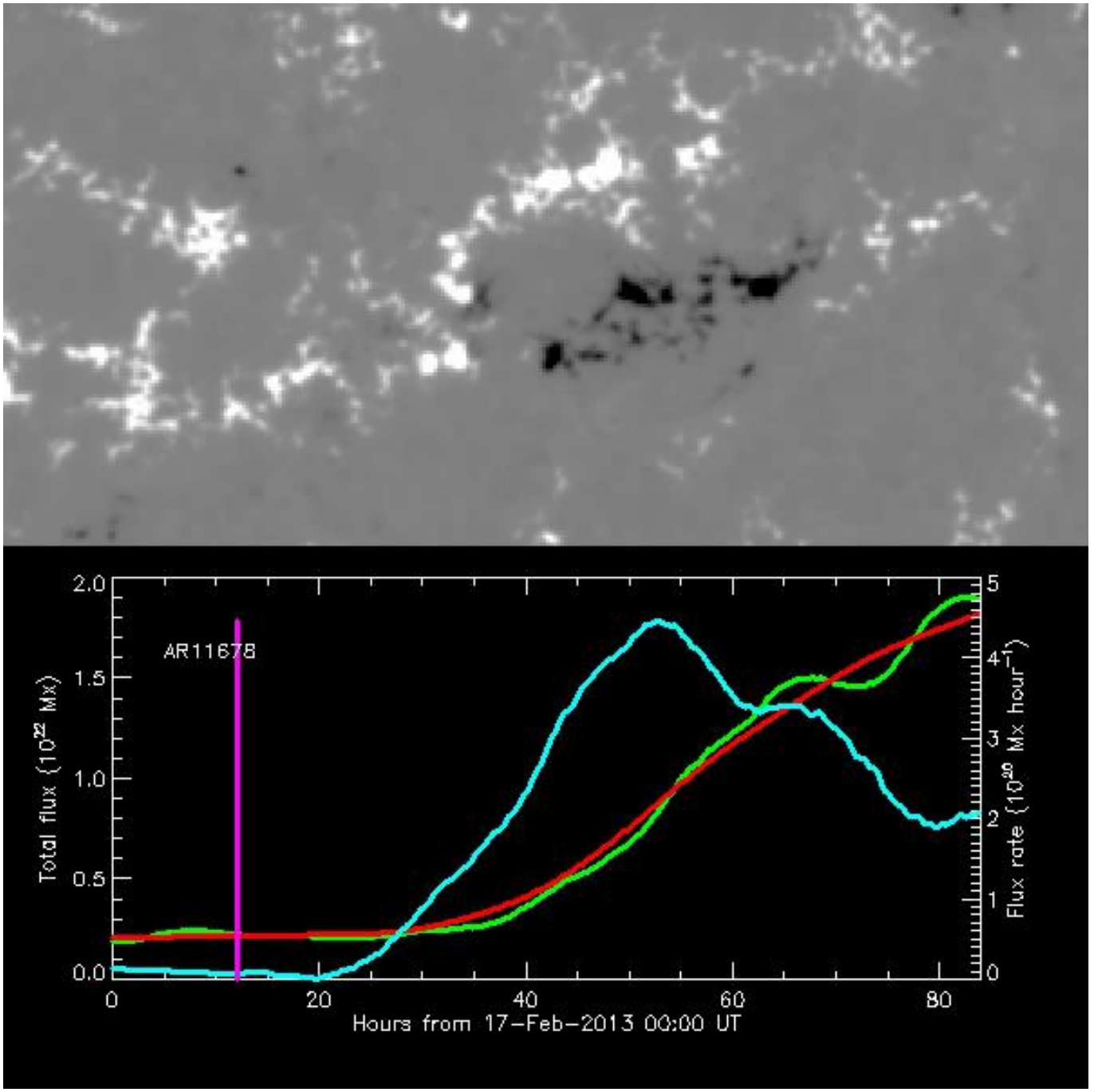


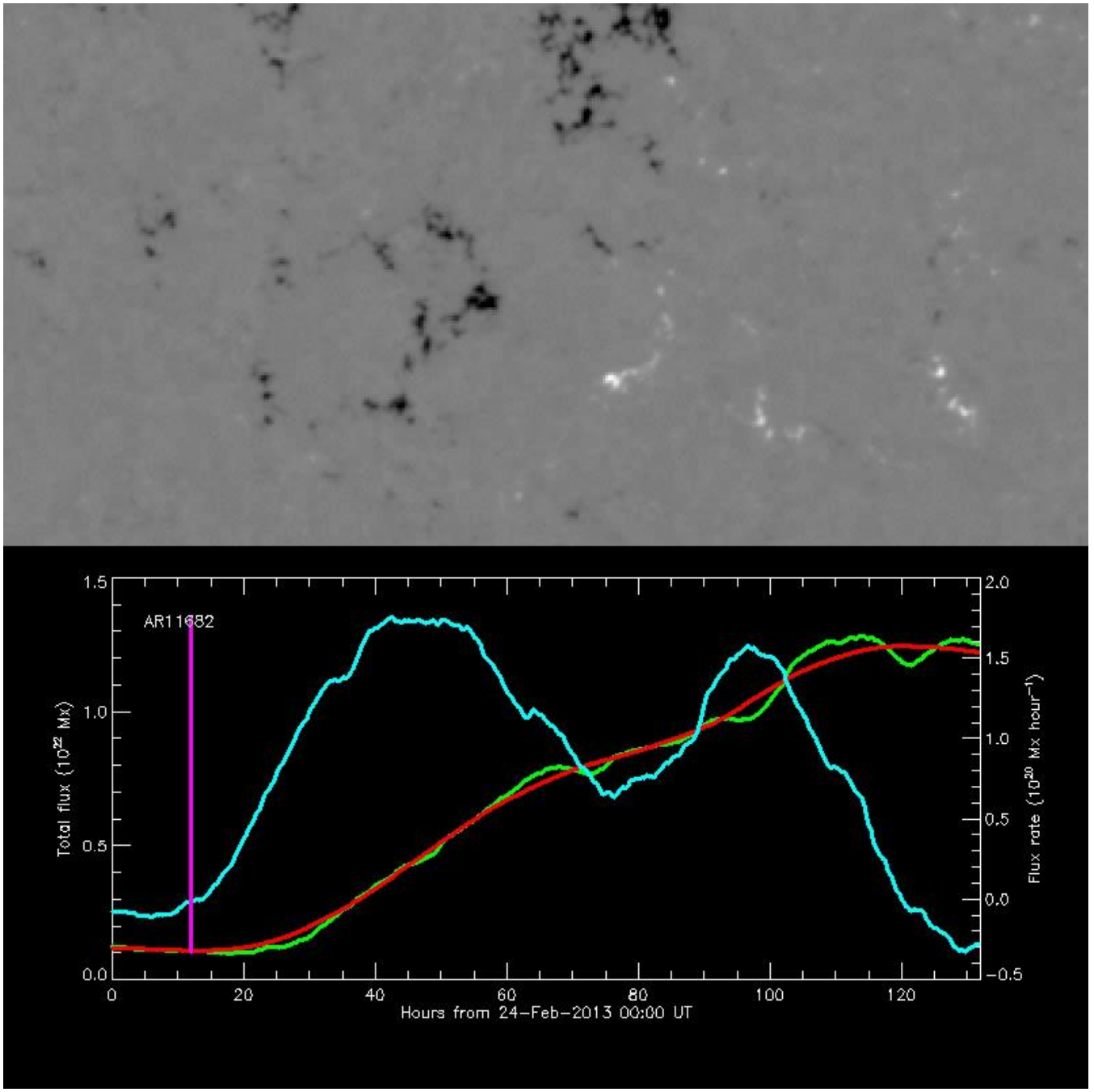
Figure 9. Sketch summarizing the relationship between emerging dark fibrils and the MDFs seen in longitudinal magnetograms. The curve **B** indicates the magnetic flux rope.


AR
NOAA 12266
HMI SHARP 5075
(a)
Total unsigned flux, Φ(t), 10^21 Mx
Hours since 2015 January 16 00:00 UT
0
2
4
6
8
10
12
0
50
100
150
200


(b)
AR NOAA 12266
2015 Jan 17
12:36 UT
(c)
AR NOAA 12266
2015 Jan 19
12:00 UT
θ


10.00
1.00
0.10
0.01
Flux emergence rate, R, 10^{20} Mx h^{-1}
0.01
0.10
1.00
10.00
100.00
Peak total unsigned flux, Φ_{max}, 10^{21} Mx


AR11678
Total flux (10^{22} Mx)
Flux rate (10^{20} Mx hour^{-1})
Hours from 17-Feb-2013 00:00 UT
0.0
0.5
1.0
1.5
2.0
0
1
2
3
4
5
0
20
40
60
80


AR11682
Total flux (10^{22} Mx)
Flux rate (10^{20} Mx hour^{-1})
Hours from 24-Feb-2013 00:00 UT
0.0
0.5
1.0
1.5
2.0
-0.5
0
20
40
60
80
100
120

Спасибо за внимание