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SUPPLEMENTARY FIGURE CAPTIONS

Figure DR1. A: Satellite image of Otog Mesa and parallel trough to the east (from bing.com/map). The geomorphically-effective wind direction is shown by the red arrow. Linear wind-parallel ridges and valleys are present on both the upwind and downwind sides of Otog Mesa. Development of the mesa-parallel Otog trough is attributed to wind scour. Downwind of the Otog Trough are sand dunes that sit at higher elevation. B: Satellite image of yardangs in Cretaceous strata along the northwestern margin of Otog Mesa (from bing.com/map). Red arrows show geomorphically-effective wind directions.

Figure DR2. Google Earth images showing the variable orientation and expression of linear loess topography across the Loess Plateau where it is prominent and ubiquitous (A-D) and spatially patchy and/or more cryptic but still resolvable (E-G). F-H also shows the clockwise rotation in linear loess topography orientation over distances of <10 km. Red arrows show the dominant orientation of the linear loess topography.

Figure DR 3. Rose diagrams of orientation measurements from ~1°×1° areas outlined in the black boxes. Mean azimuth values and their standard deviations are indicated where orientations are unimodal.

Figure DR4. Mean (from 1979-2010) near-surface (10 m height) wind vectors during A: spring, B: summer, C: fall, and D: winter. Near-surface (10 m height) wind vectors averaged over a 6-hour time period of maximum wind speed during documented dust storms: E: March 19, 2010 (Ling et al., 2011); F: March 27, 1985 (Song et al., 2009); and G: March 15, 1999 (Liu et al., 2004). Data are from the National Oceanic and Atmospheric Administration's Climate Forecast System Reanalysis (Saha et al., 2010).

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Ling, X.-L., Guo, W.-D., Zhao, Q.-F., and Zhang, B.-D., 2011, A case study of a typical dust storm event over the Loess Plateau of northwest China: Atmospheric and Oceanic Science Letters, v. 4, p. 344-348.

Liu, L.Y., Shi, P.J., Gao, S.Y., Zou, X.Y., Erdon, H., Yan, P., Li, X.Y., Ta, W.Q., Wang, J.H., and Zhang, C.L., 2004, Dustfall in China's western loess plateau as influenced by dust storm and haze events: Atmospheric Environment, v. 38, p. 1699-1703.

Saha, S., et al., 2010, The NCEP Climate Forecast System Reanalysis: American Meteorological Society, v. 91, p. 1015-1057.

Song, M.H., Qian, Z.A., Cai, Y., and Liu, C.M., 2009, Analyses of spring mean circulations for major and minor dust storm years in China-Mongolia area: Sciences in Cold and Arid Regions, v. 1, p. 361-371.

Figure DR1A

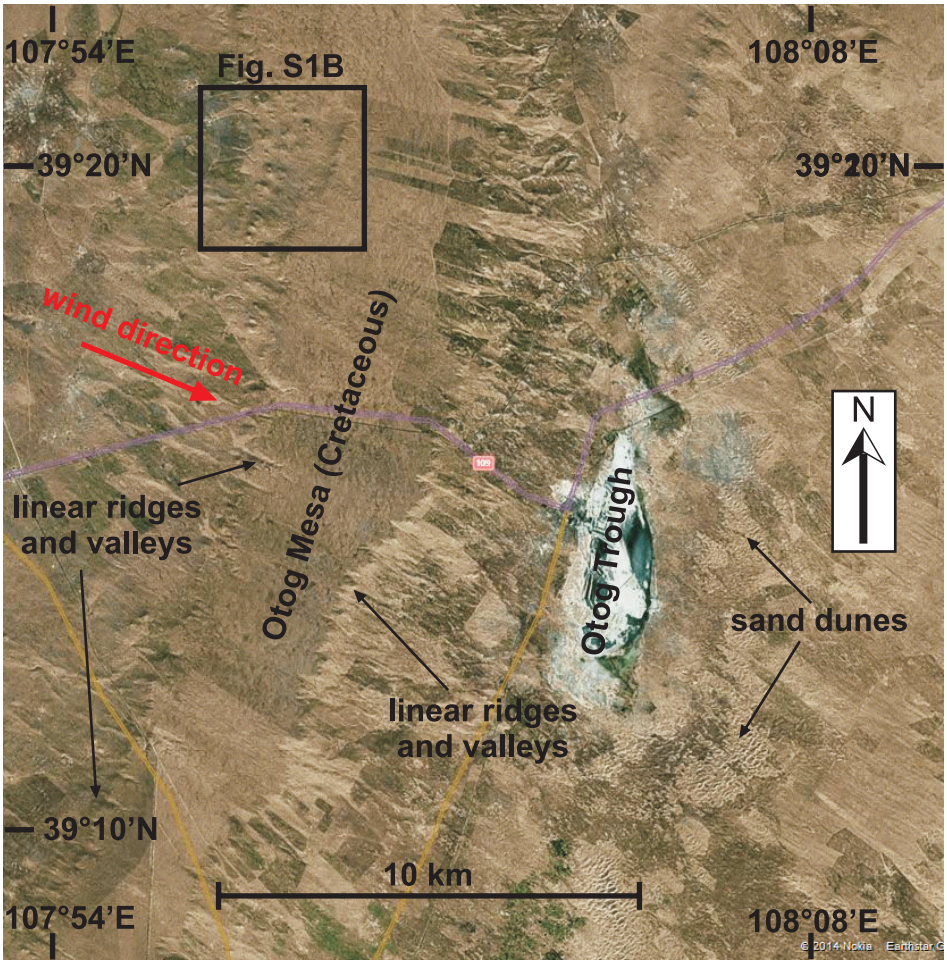

Figure DR1B

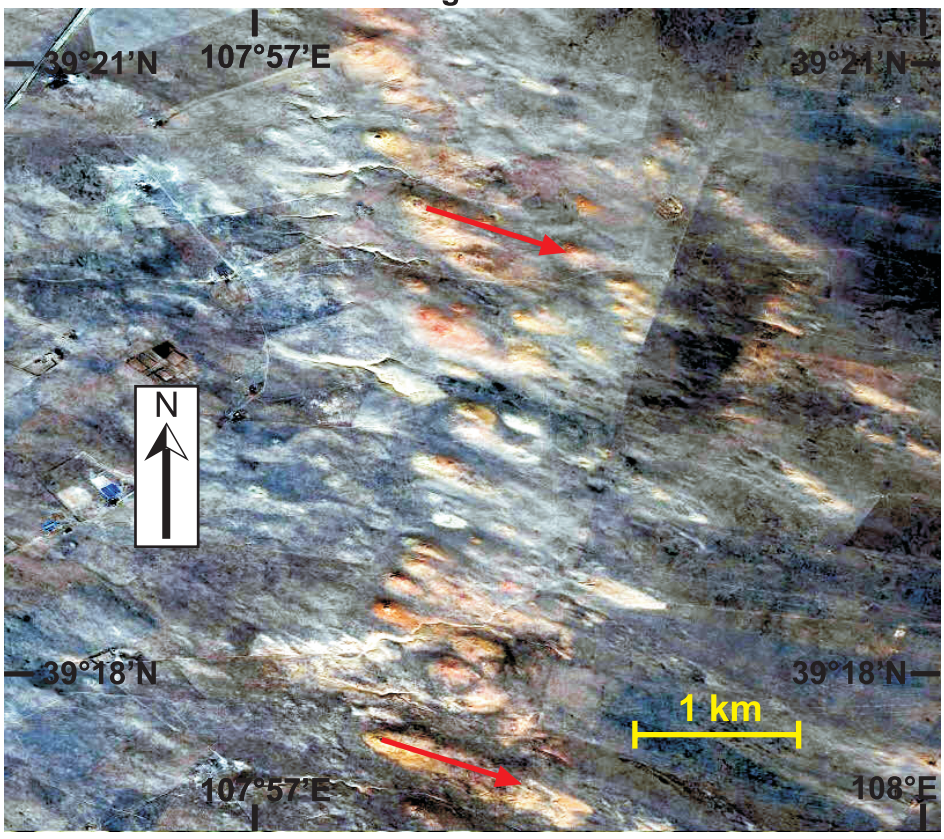

Figure DR2A

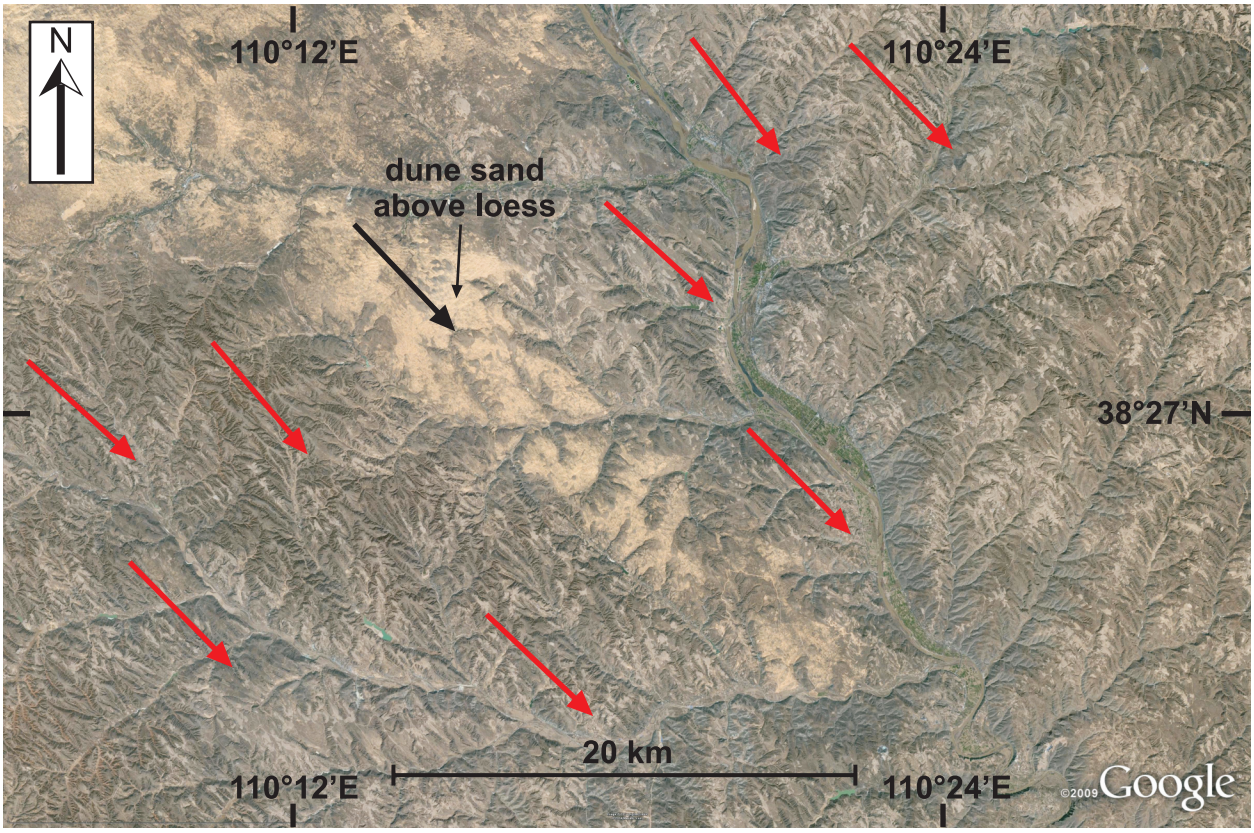
N
110°12'E
110°24'E
dune sand
above loess
38°27'N
20 km
110°12'E
110°24'E
©2009 Google

Figure DR2B

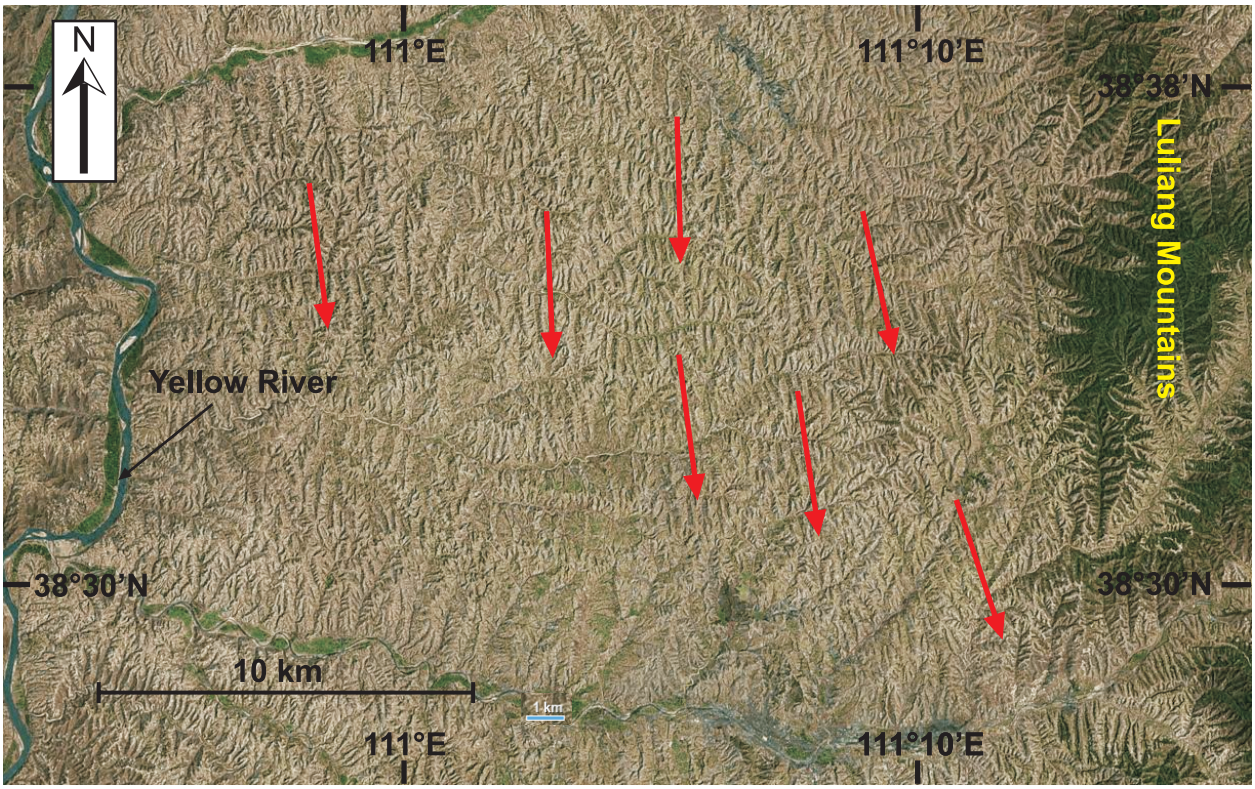
N
111°E
111°10'E
38°38'N
Luliang Mountains
Yellow River
38°30'N
38°30'N
10 km
1 km
111°E
111°10'E

Figure DR2C

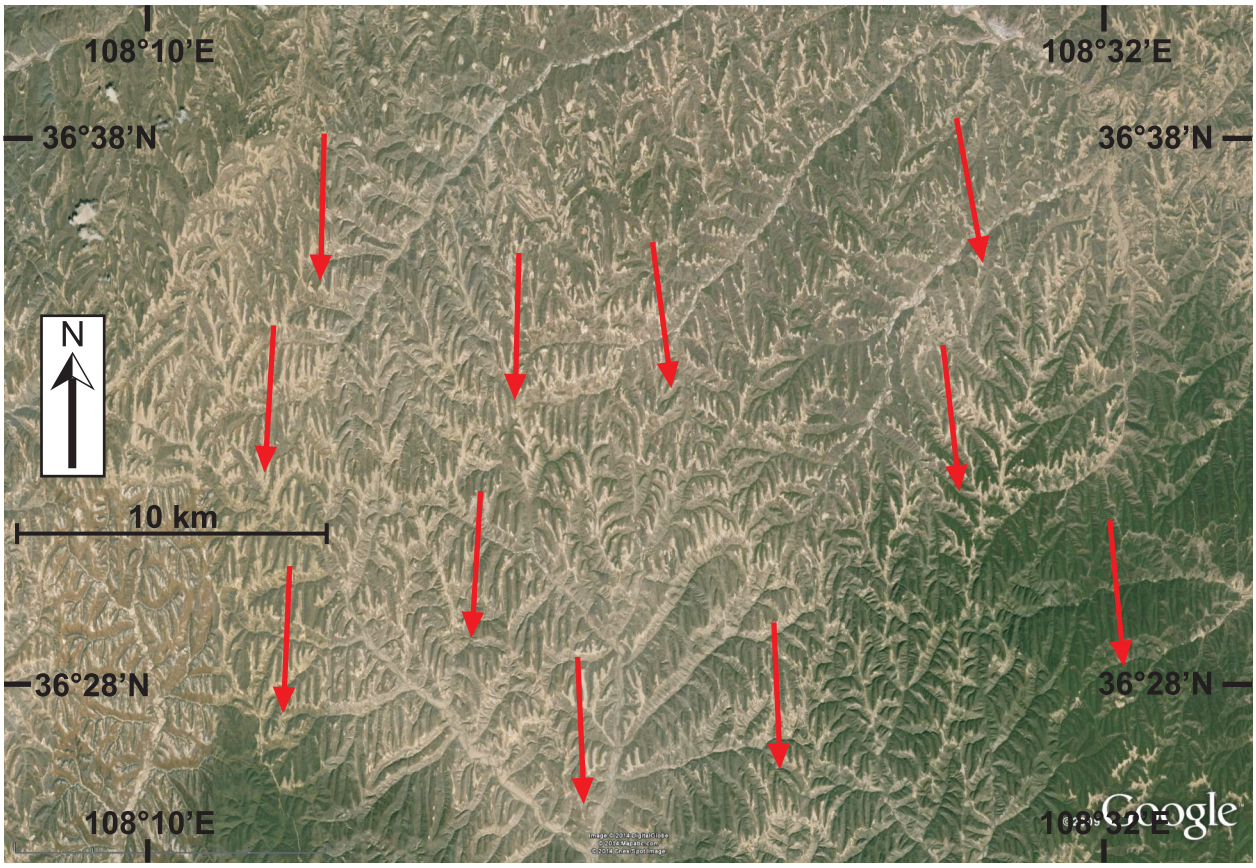

Figure DR2D

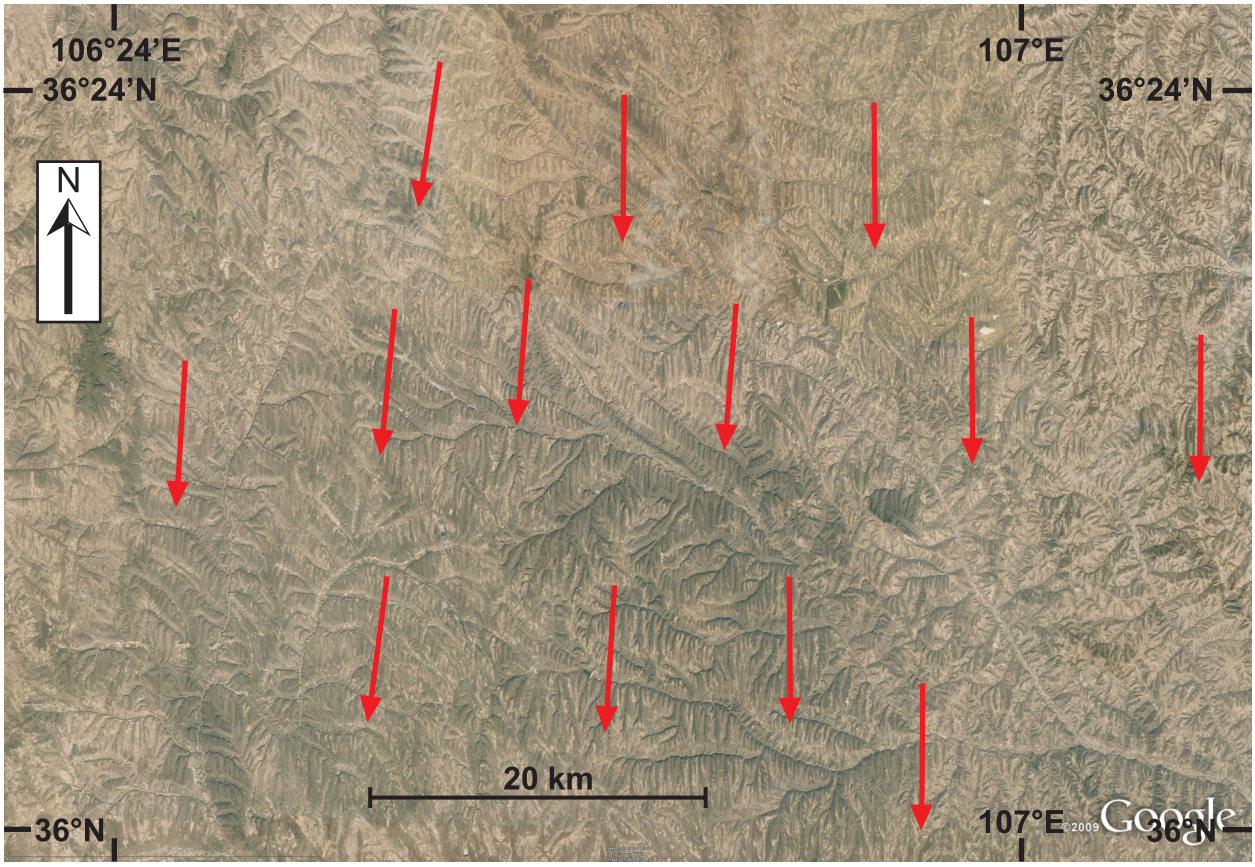

Figure DR2E

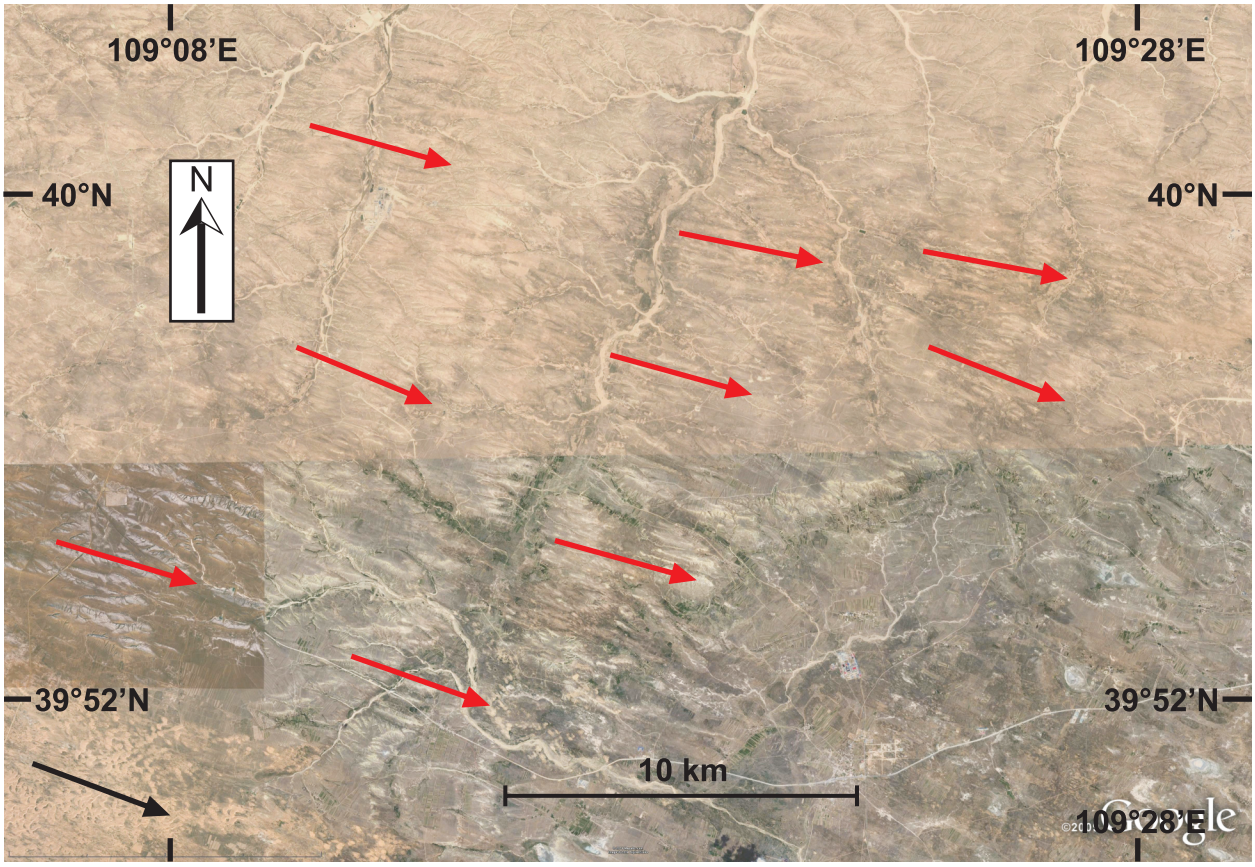

Figure DR2F

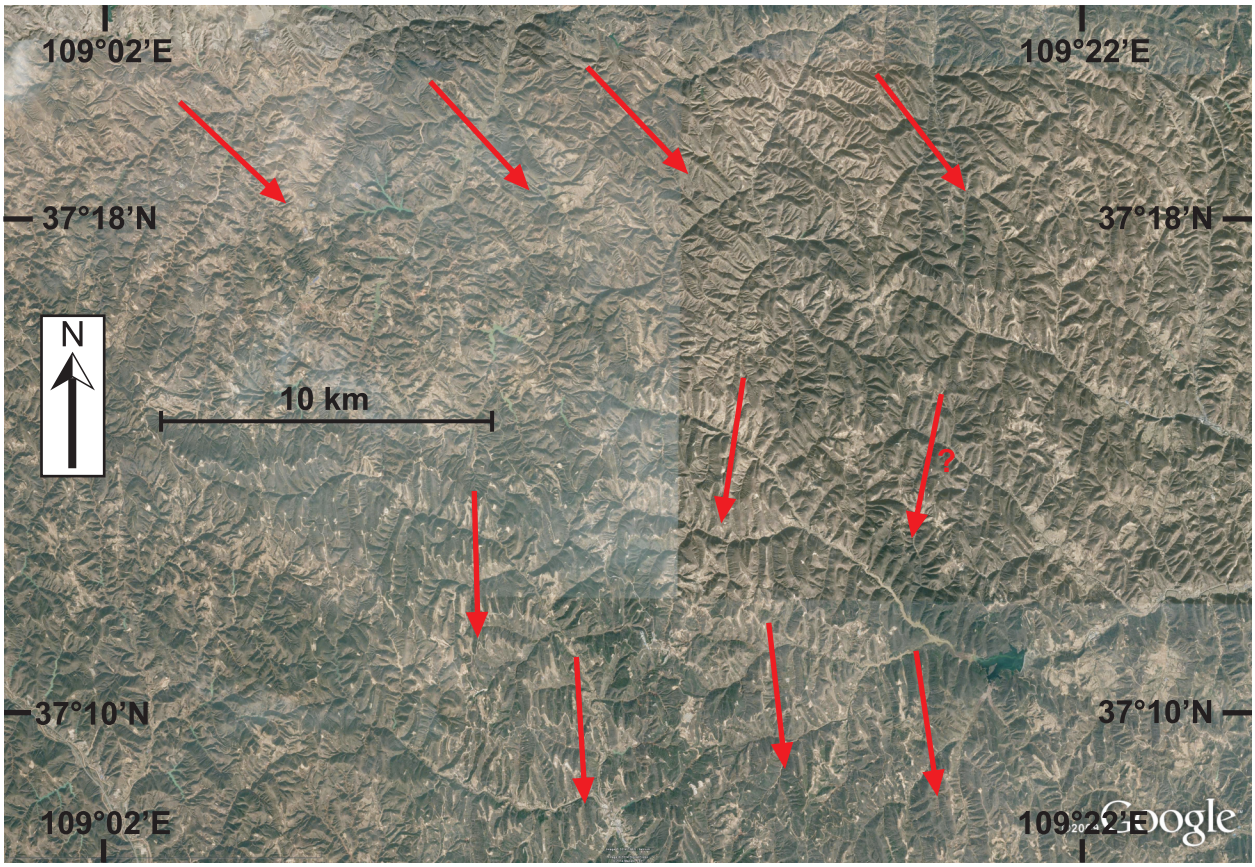
109°02'E
109°22'E
37°18'N
37°18'N
N
10 km
?
37°10'N
37°10'N
109°02'E
109°22'E
Google

Figure DR2G

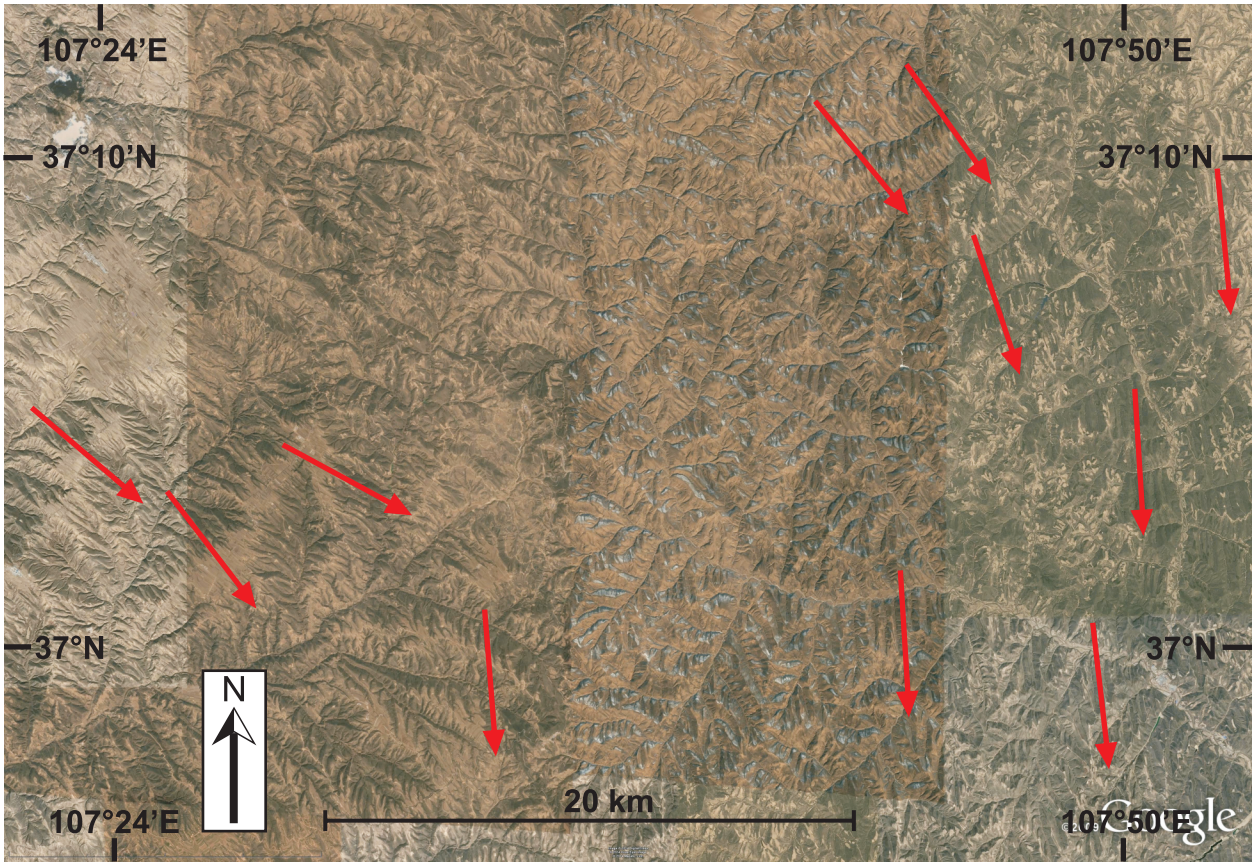
107°24’E
107°50’E
37°10’N
37°10’N
37°N
37°N
N
20 km
107°24’E
107°50’E
Google

Figure DR2H

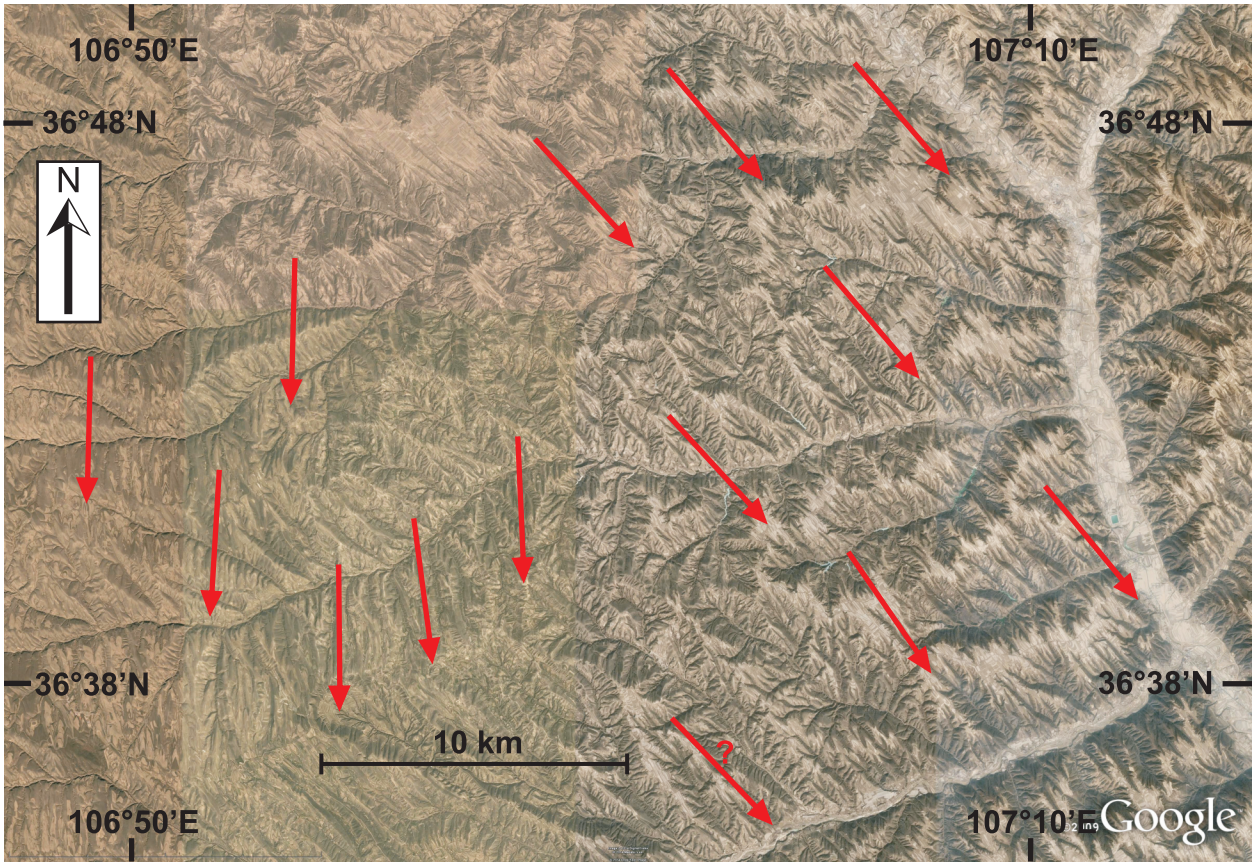
106°50'E
107°10'E
36°48'N
36°48'N
N
36°38'N
36°38'N
10 km
?
106°50'E
107°10'E
Google

Figure DR3

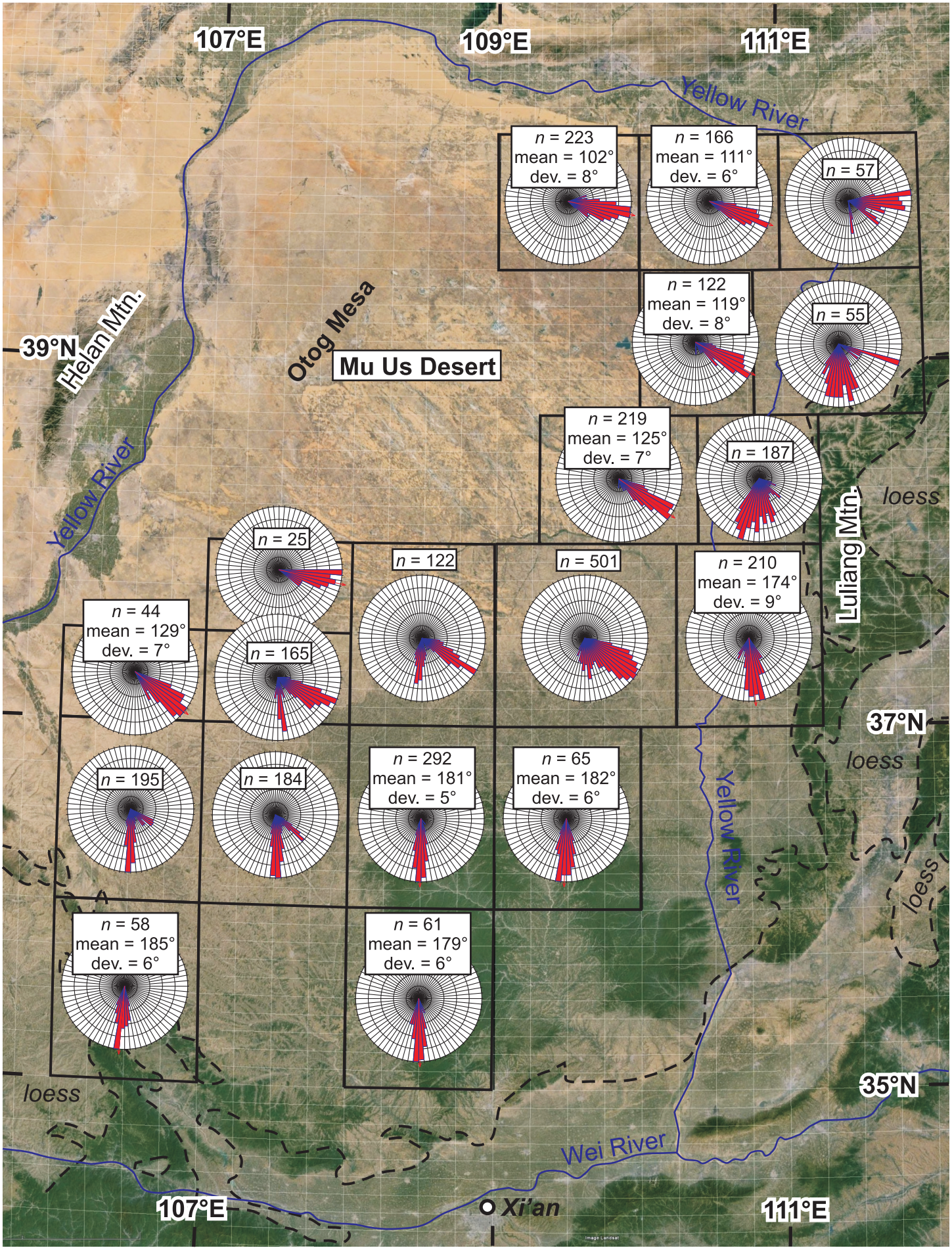
107°E
109°E
111°E
Yellow River
n = 223
mean = 102°
dev. = 8°
n = 166
mean = 111°
dev. = 6°
n = 57
n = 122
mean = 119°
dev. = 8°
n = 55
39°N
Helan Mtn.
Otog Mesa
Mu Us Desert
n = 219
mean = 125°
dev. = 7°
n = 187
Yellow River
loess
Luliang Mtn.
n = 25
n = 122
n = 501
n = 210
mean = 174°
dev. = 9°
n = 44
mean = 129°
dev. = 7°
n = 165
37°N
loess
n = 195
n = 184
n = 292
mean = 181°
dev. = 5°
n = 65
mean = 182°
dev. = 6°
Yellow River
loess
n = 58
mean = 185°
dev. = 6°
n = 61
mean = 179°
dev. = 6°
loess
35°N
Wei River
107°E
Xi'an
111°E

Figure **DR**4A

Mean Spring (March-Arpil-May, 1979-2010)

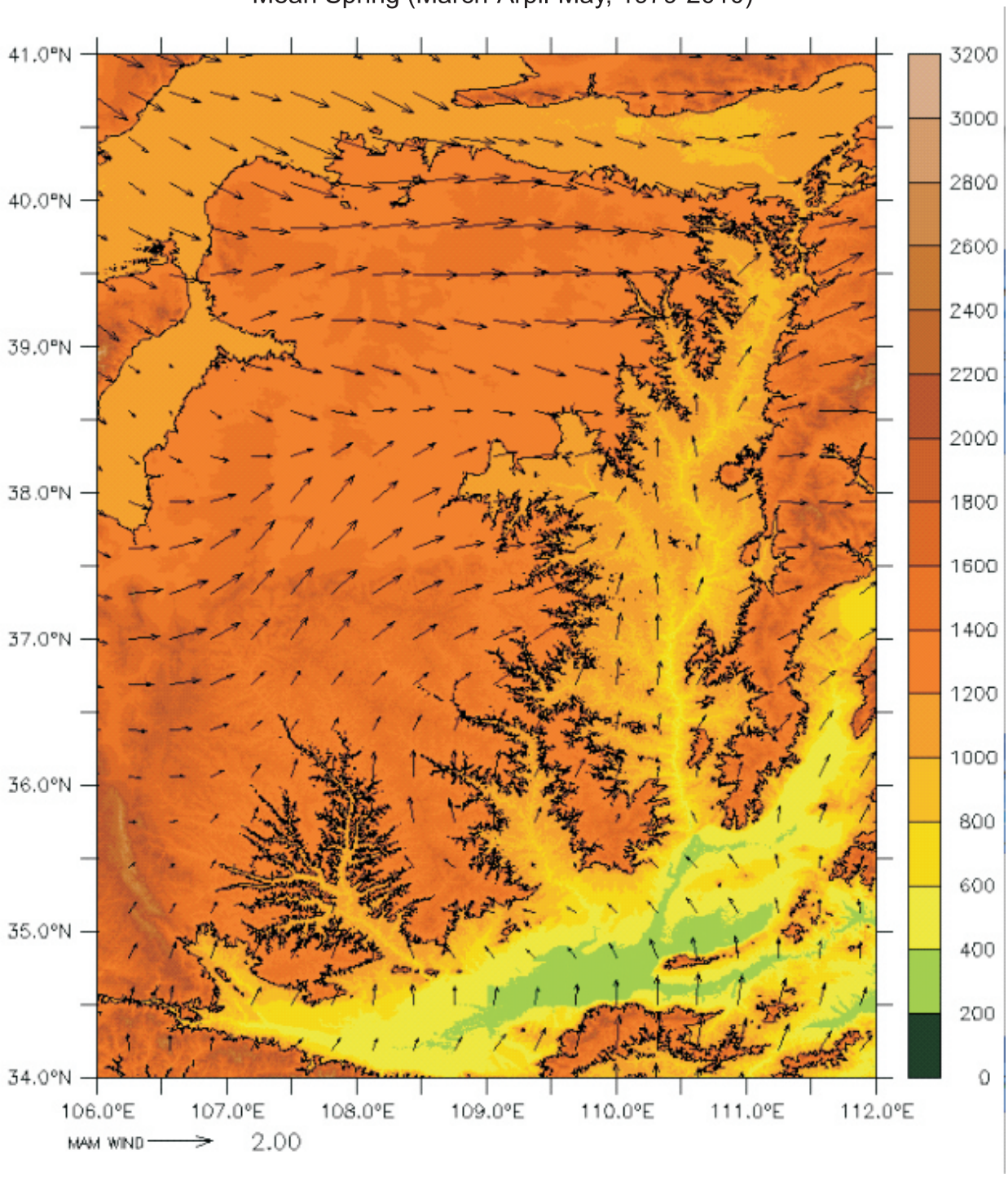

Figure **DR**4B

Mean Summer (June-July-August, 1979-2010)

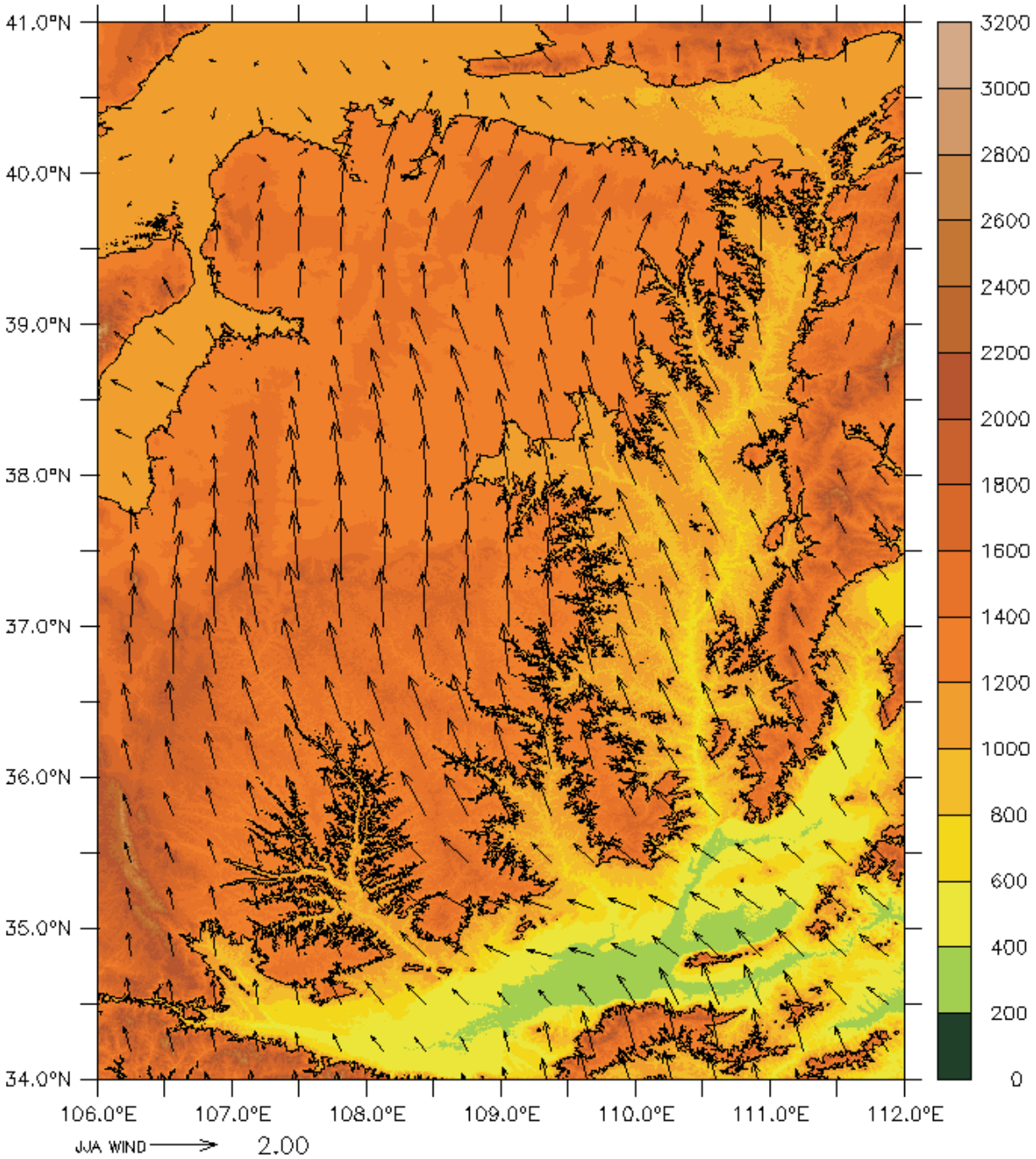

Figure **DR**4C

Mean Fall (September-October-November, 1979-2010)

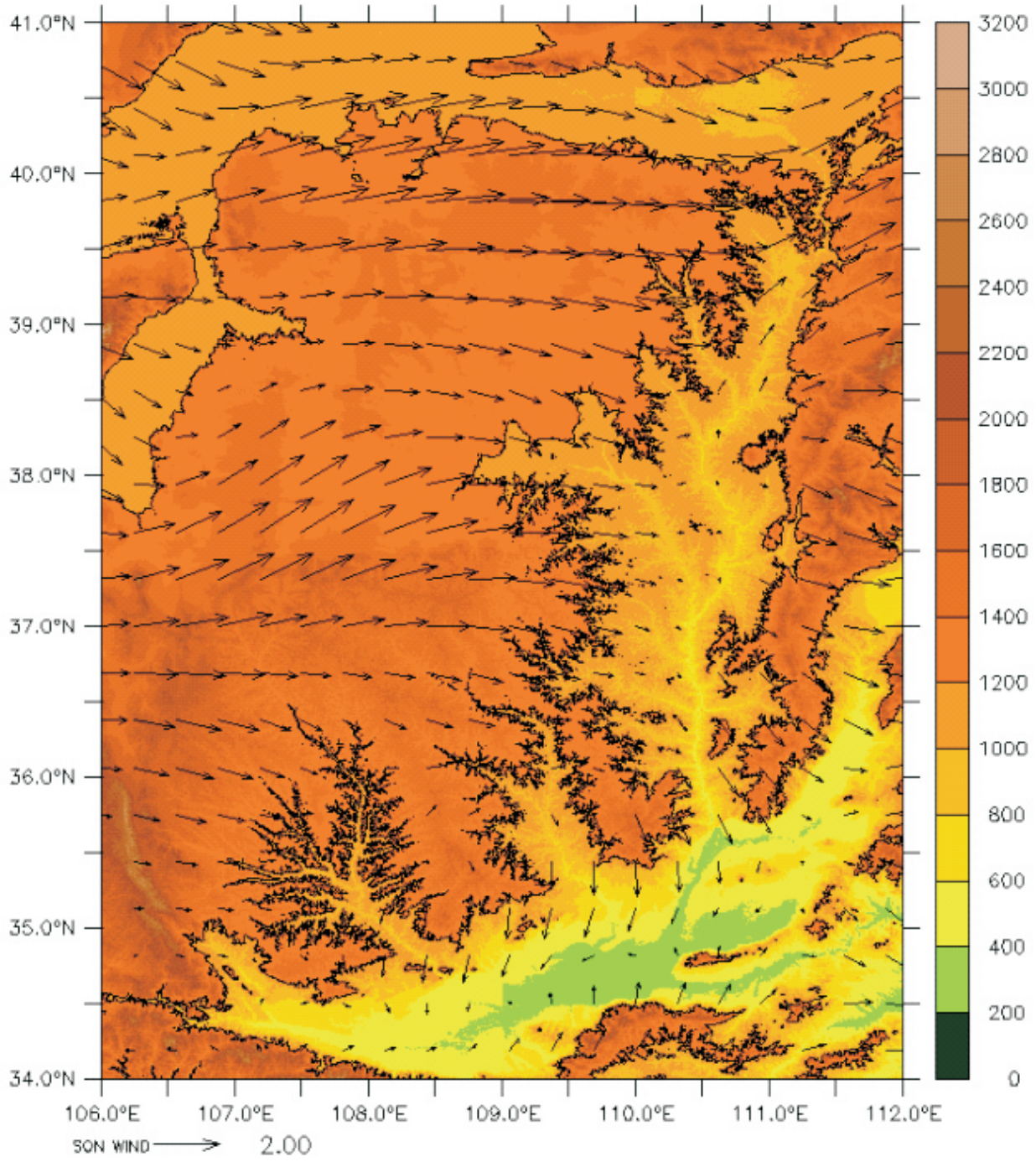

Figure **DR** 4D

Mean Winter (December-January-February, 1979-2010)

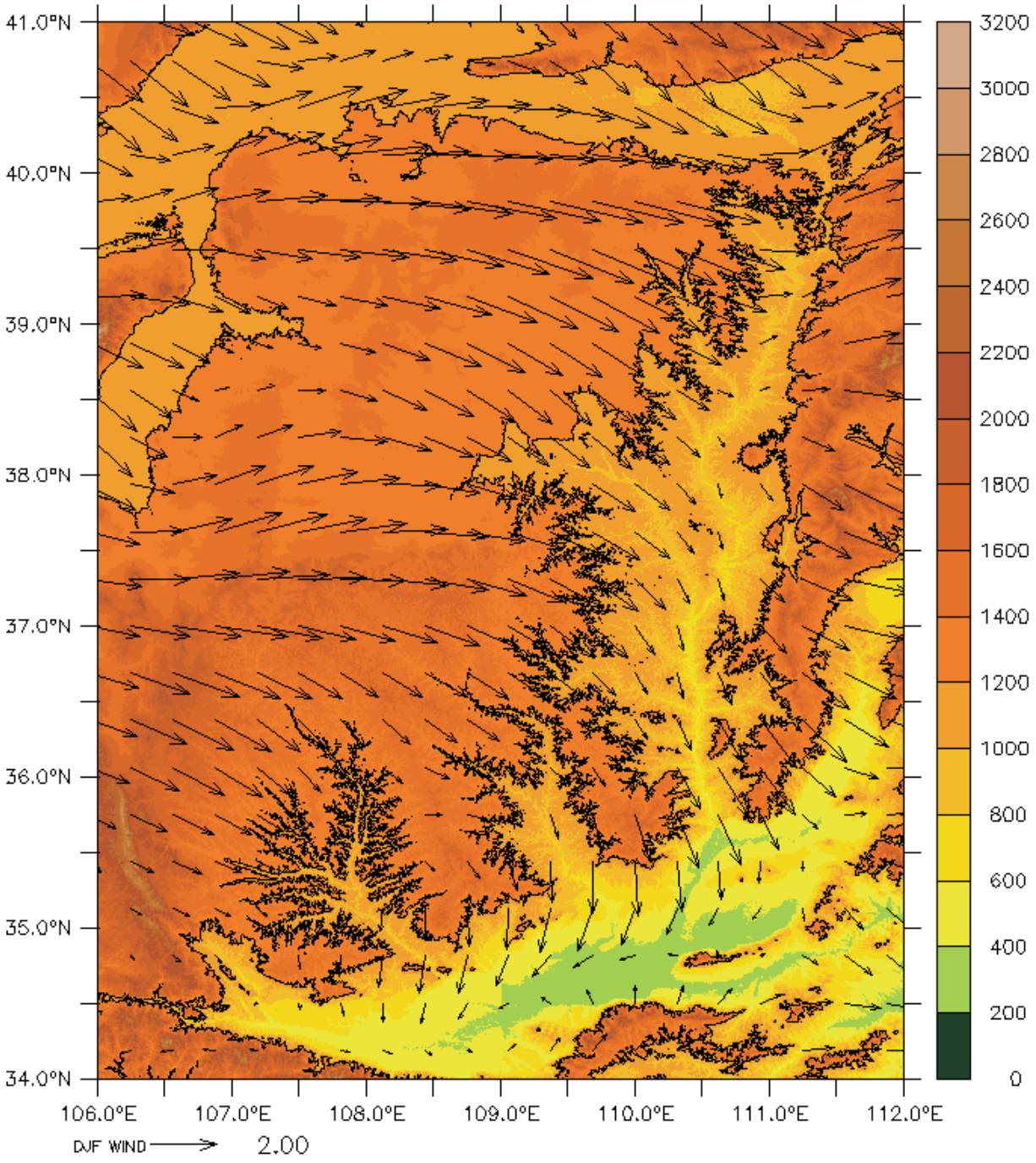

Figure **DR**4E

March 19, 2010 wind storm

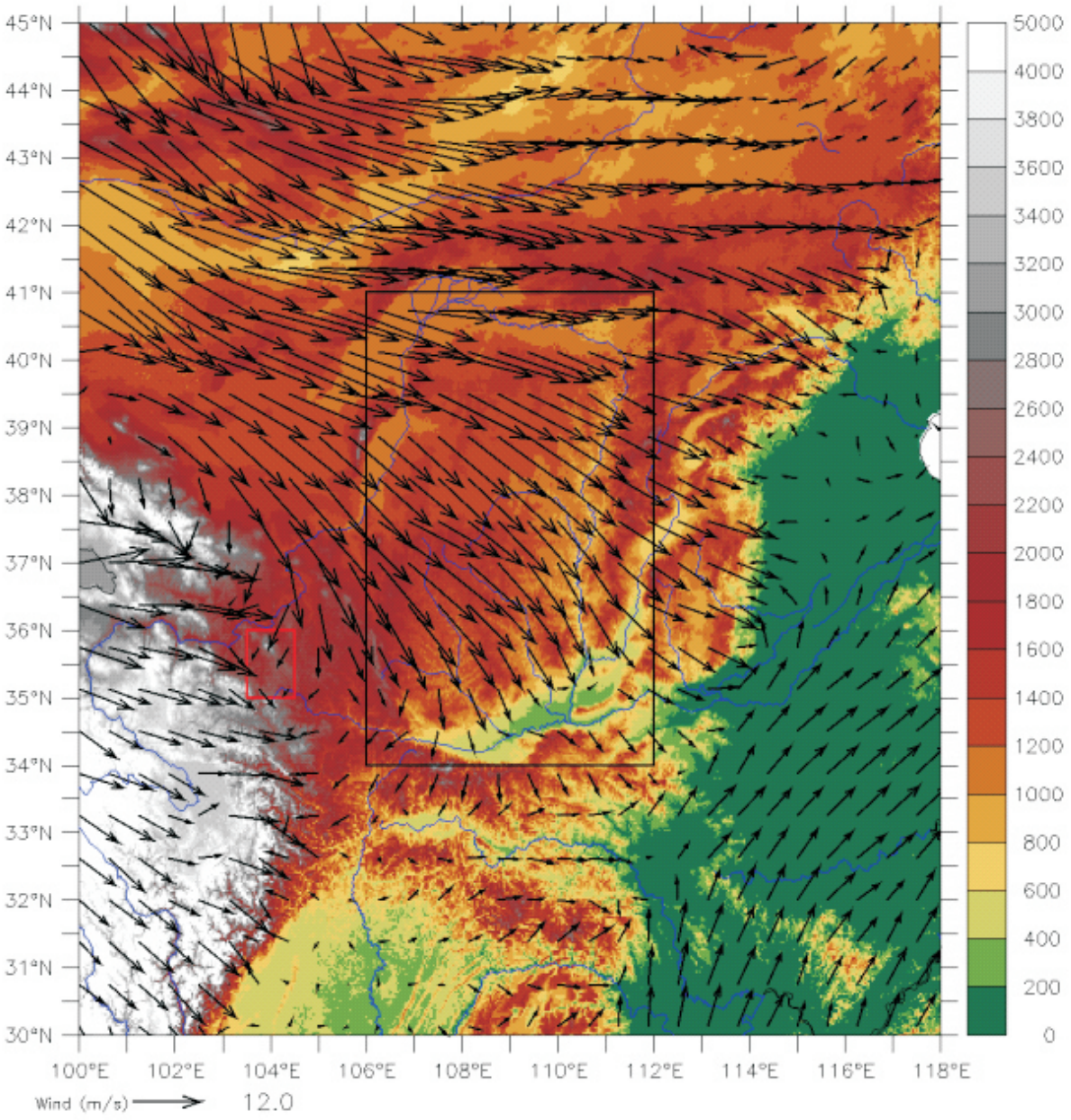

Figure **DR** 4F

March 27, 1985 wind storm

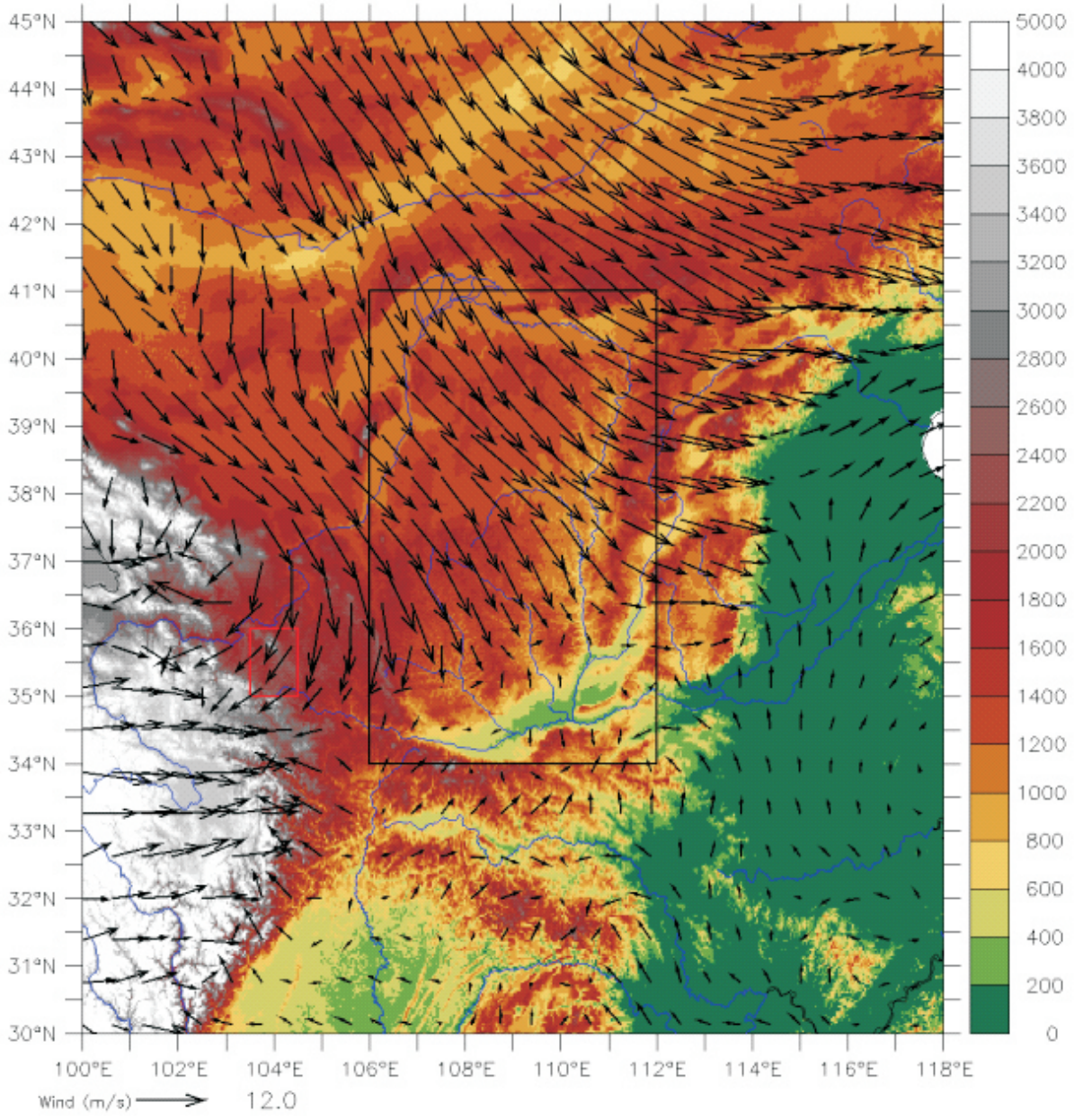

Figure **DR**4G

March 15, 1999 wind storm