VLB ARRAY MEMO No. 481

NATIONAL RADIO ASTRONOMY OBSERVATORY
Socorro, New Mexico

1 Sept. 1985

To: VLBA Operations
From: Craig Walker
Subject: Construction Arrays.

We have been considering the level of operations needed for the VLBA during construction. We will need to support observations with the NUG, which amounts to a bit less than 1/4 time. As more antennas become available, there will also be demand for observations using just VLBA antennas or VLBA plus one or two outside antennas. This demand will depend on the quality of the uv coverage available. Investigating all possible options with outside antennas is too big a parameter space to address in a memo but it is instructive to examine the coverage available with just the VLBA. The figures attached to this memo give the coverage available as each new antenna comes on-line.

With 3 antennas, some limited work with relatively low resolution will be possible. The fourth antenna (Washington) adds a lot to the coverage of NUG experiments but is too far from the first 3 VLBA antennas to provide much interesting coverage for pure VLBA experiments. By the time the fifth antenna, Fort Davis, is added, significant science can be done with baselines less than about 700 km. The sixth antenna (Puerto Rico or Virgin Islands) will also be very good for NUG but is somewhat isolated in the partial VLBA. When the seventh antenna, Iowa, is added, the coverage is as good as for many current experiments and I would guess demand will exceed time available. The rest round out the coverage and resolution toward the full system.

From the above, I would hazard a guess that demand will rise from a few days a month with 3 antennas to maybe a bit less than half time at 5 antennas to full time when 7 antennas are available. Of course, the time that can be made available will depend on the operating budget available and on the correlator capacity. The latter will depend on Caltech and Haystack until some portion of the VLBA correlator is operational. It would be good to have some sort of VLBA correlation capacity when Iowa comes on-line, budgets

PIETOWN	34.33	108.14
KITT	31.96	111.60
LASL2	35.81	106.27

Scale in km
kilometers x 10^2)

1000 km

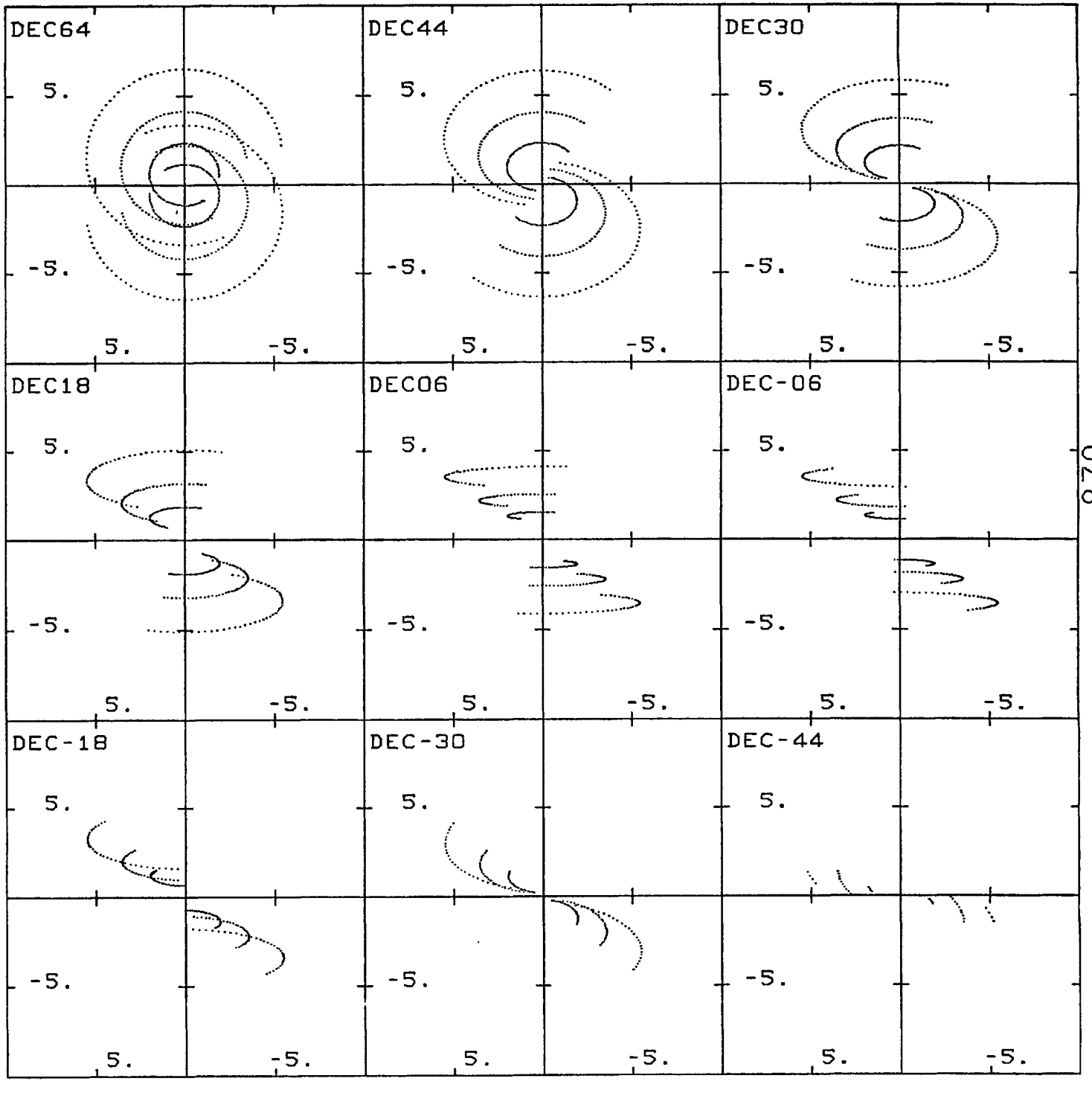

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Figure 1

PIETOWN	34.33	108.14
KITT	31.96	111.60
LASL2	35.81	106.27
OROVILE	48.90	119.75

Scale in km
: kilometers x 10^2)

2000 km

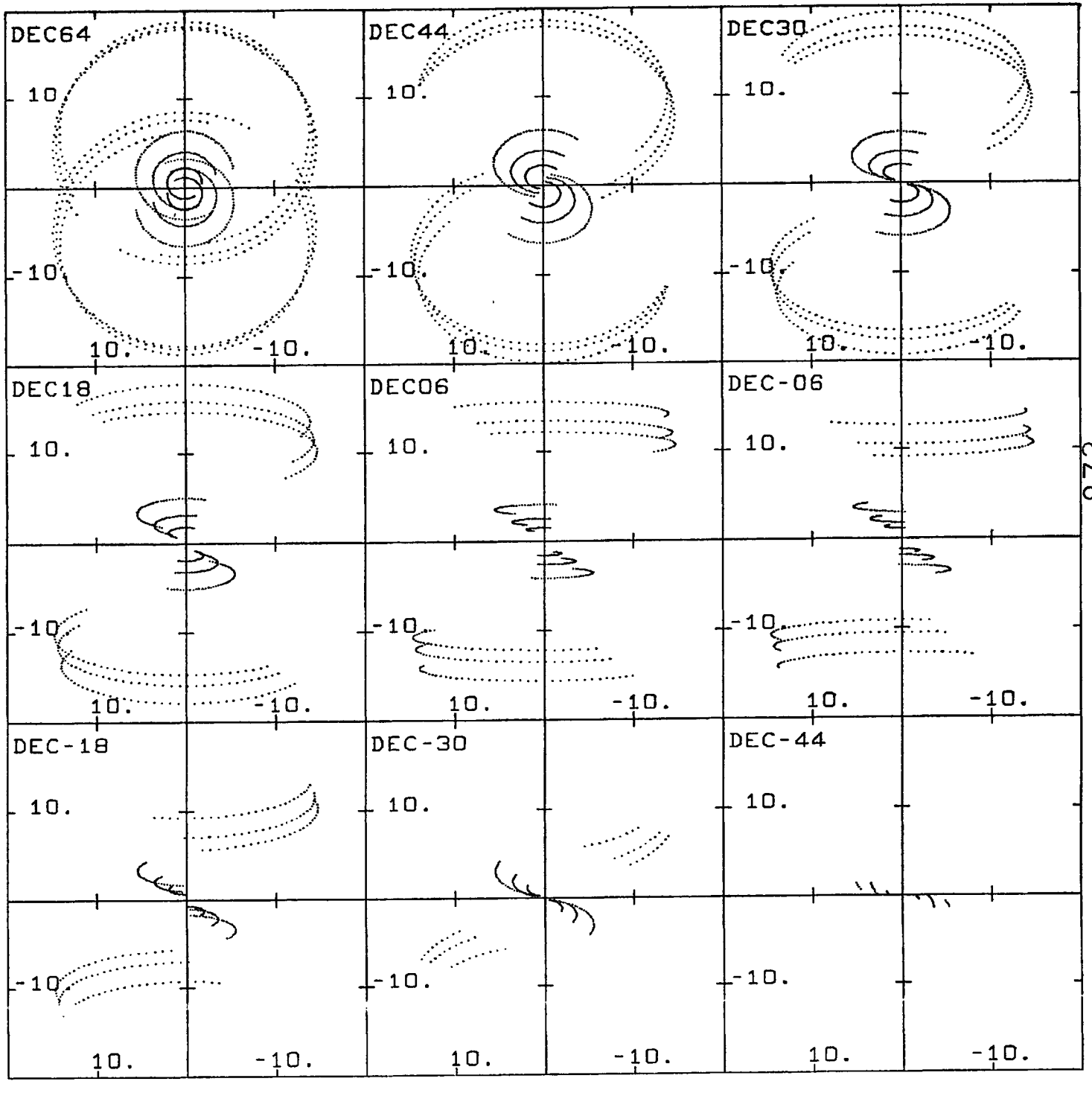

Figure 2

PIETOWN	34.33	108.14
KITT	31.96	111.60
LASL2	35.81	106.27
OROVILE	48.90	119.75
FDVSNEW	30.47	103.95

Scale in km
(kilometers x 10^2)

2000 km

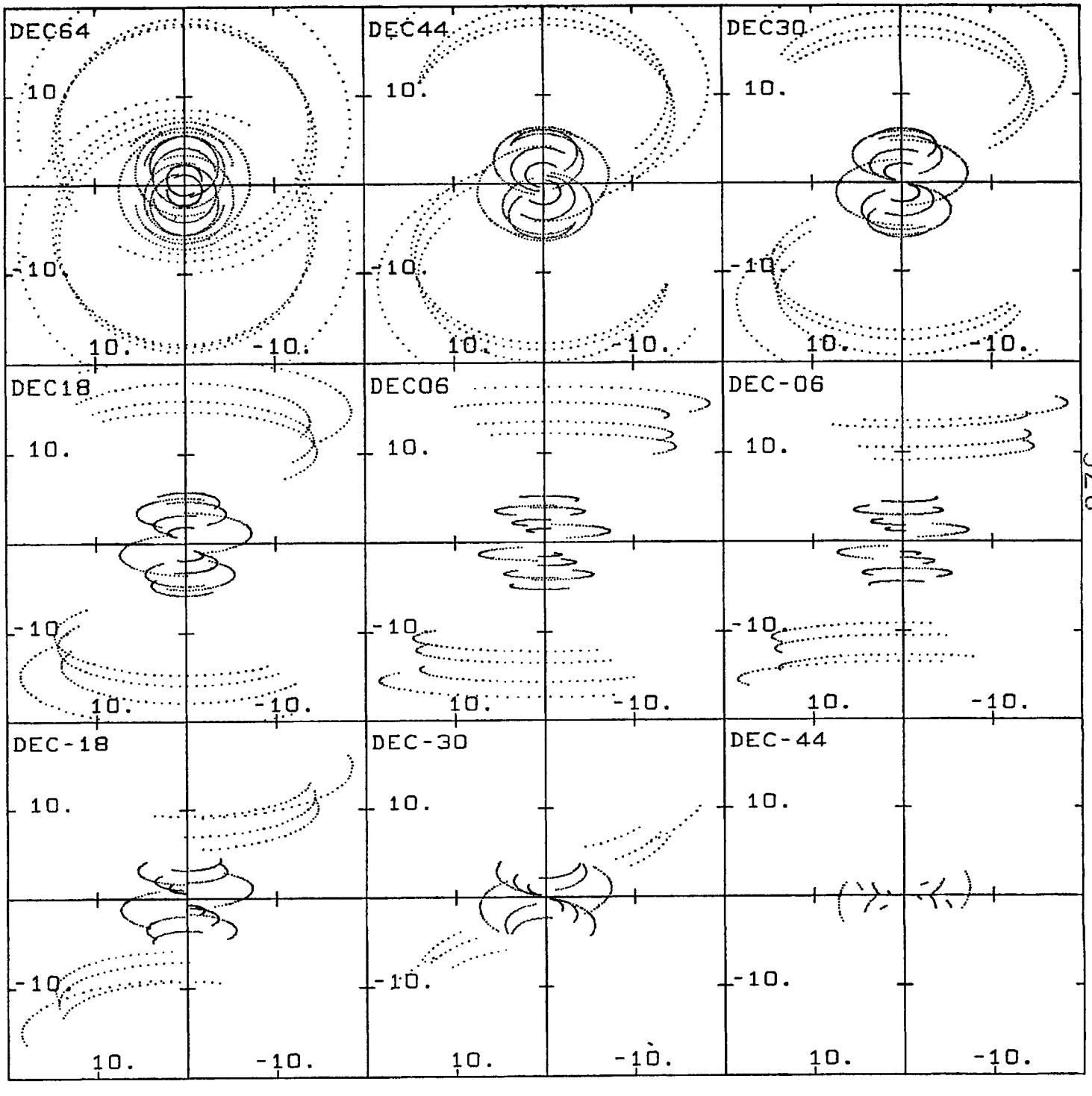

Figure 3

PIETOWN	34.33	108.14
KITT	31.96	111.60
LASL2	35.81	106.27
OROVILE	48.90	119.75
FDVSNEW	30.47	103.95
ARECIBO	18.34	66.75

Scale in km
(kilometers x 10^3)

4000km

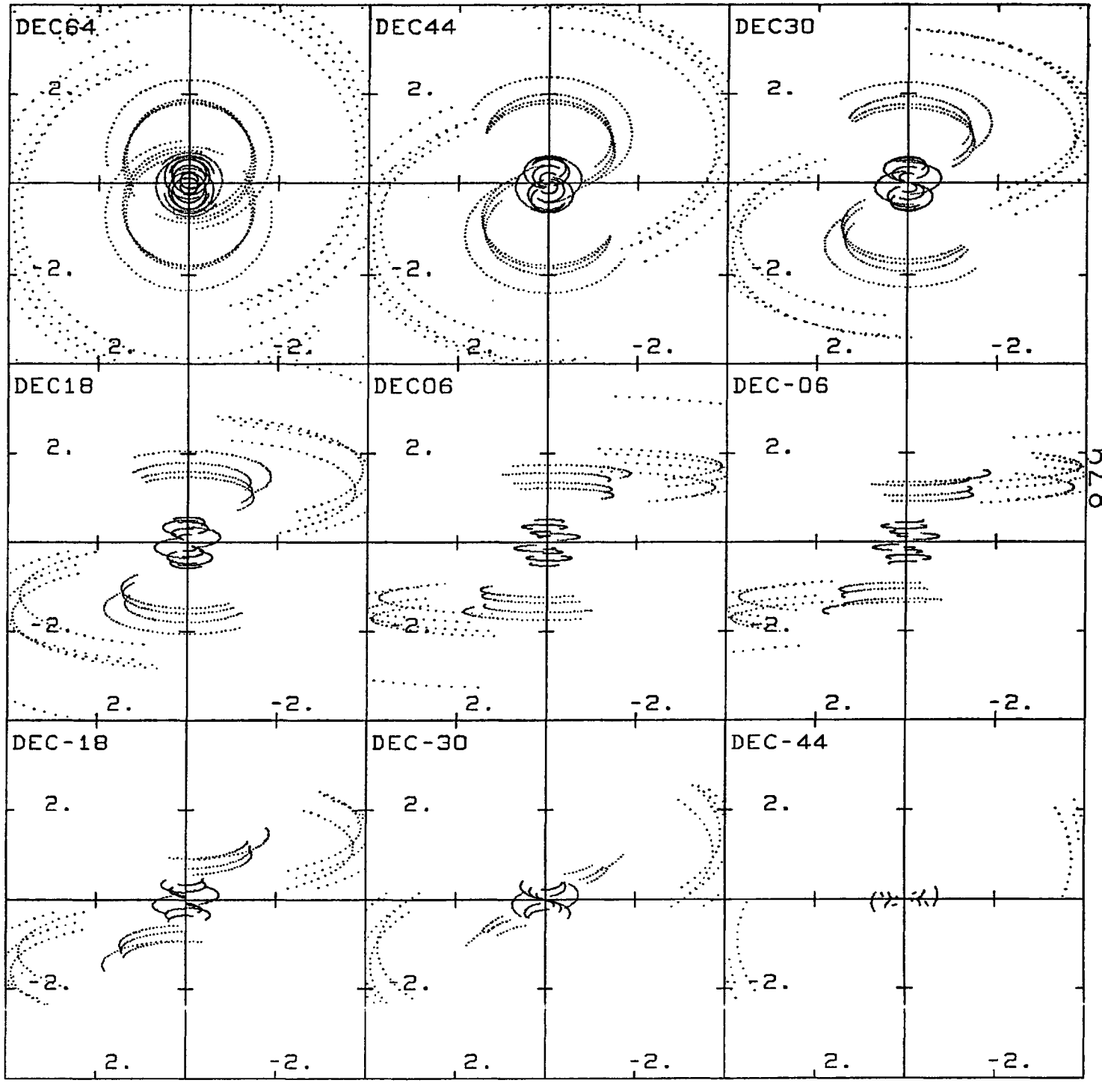

Figure 4

PIETOWN	34.33	108.14
KITT	31.96	111.60
LASL2	35.81	106.27
OROVILE	48.90	119.75
FDVSNEW	30.47	103.95
ARECIBO	18.34	66.75
IOWA	41.58	91.57

Scale in km
kilometers x 10^3)

4000 km

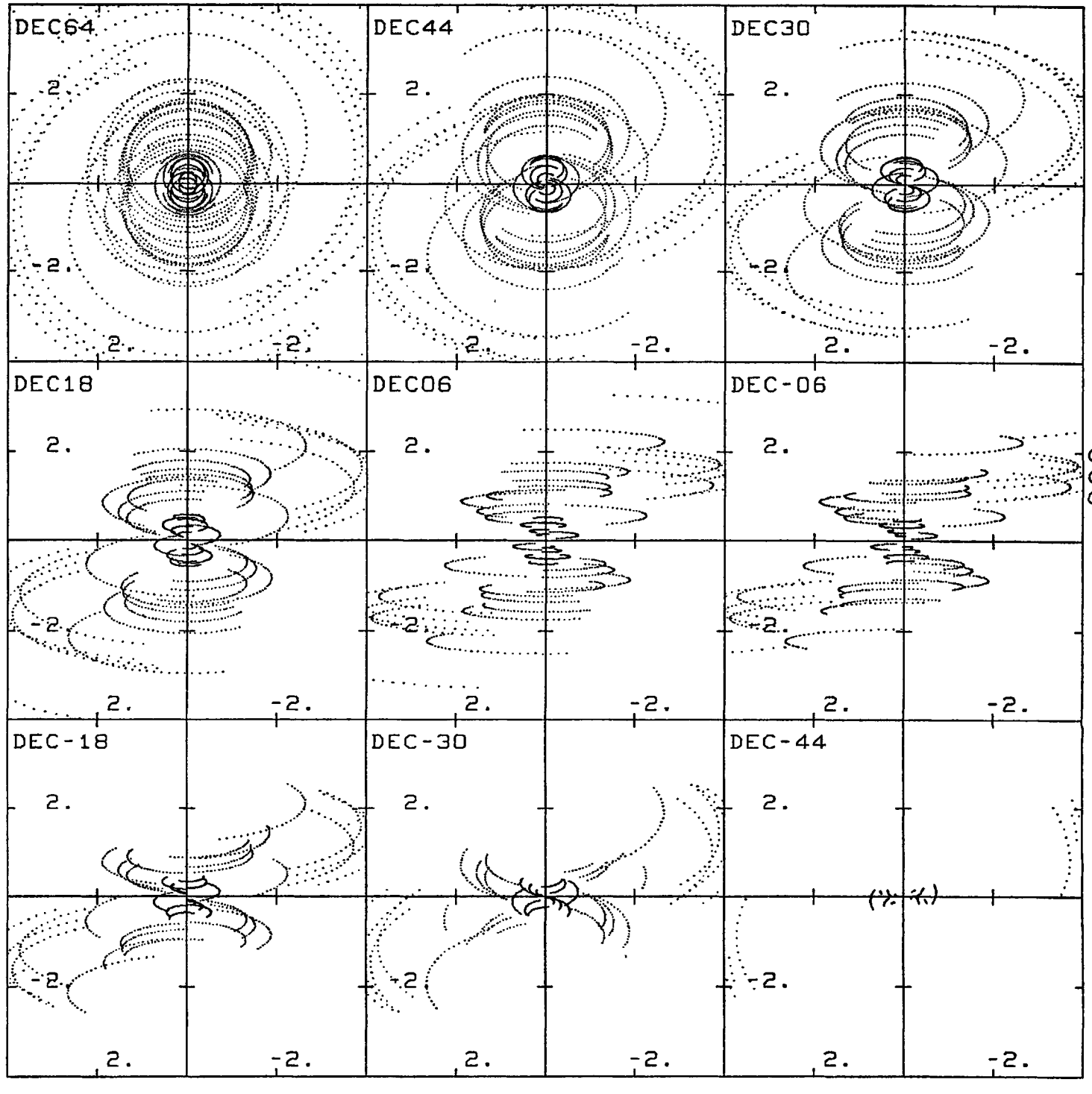

Figure 5

PIETOWN	34.33	108.14
KITT	31.96	111.60
LASL2	35.81	106.27
OROVILE	48.90	119.75
FDVSNEW	30.47	103.95
ARECIBO	18.34	66.75
IOWA	41.58	91.57
OVRO	37.05	118.28

Scale in km
: kilometers x 10^3)

4000 km

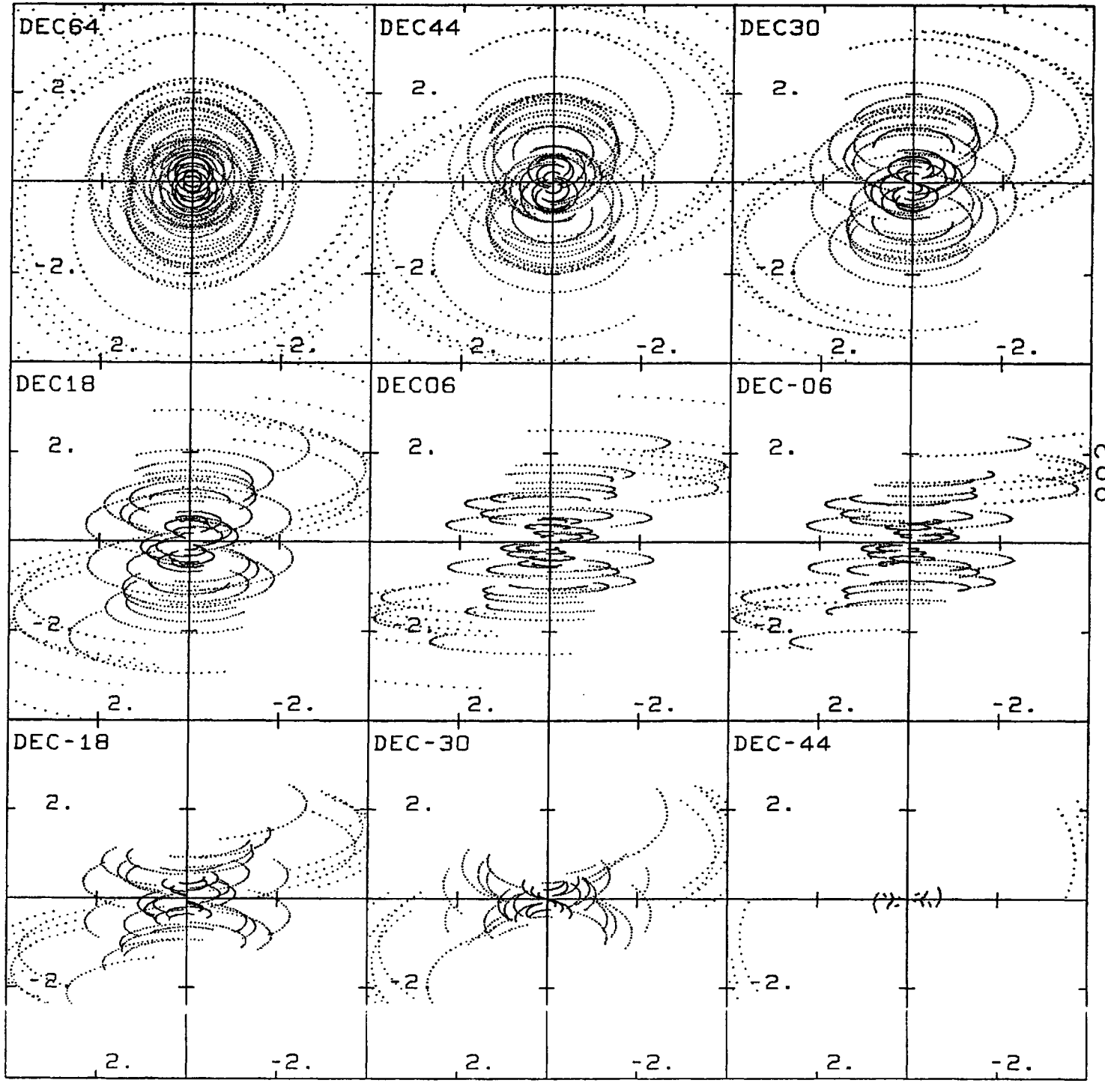

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Figure 6

PIETOWN	34.33	108.14
KITT	31.96	111.60
LASL2	35.81	106.27
OROVILE	48.90	119.75
FDVSNEW	30.47	103.95
ARECIBO	18.34	66.75
IOWA	41.58	91.57
OVRO	37.05	118.28
HAWAII	19.80	155.50

Scale in km
: kilometers x 10^3)

8000 km

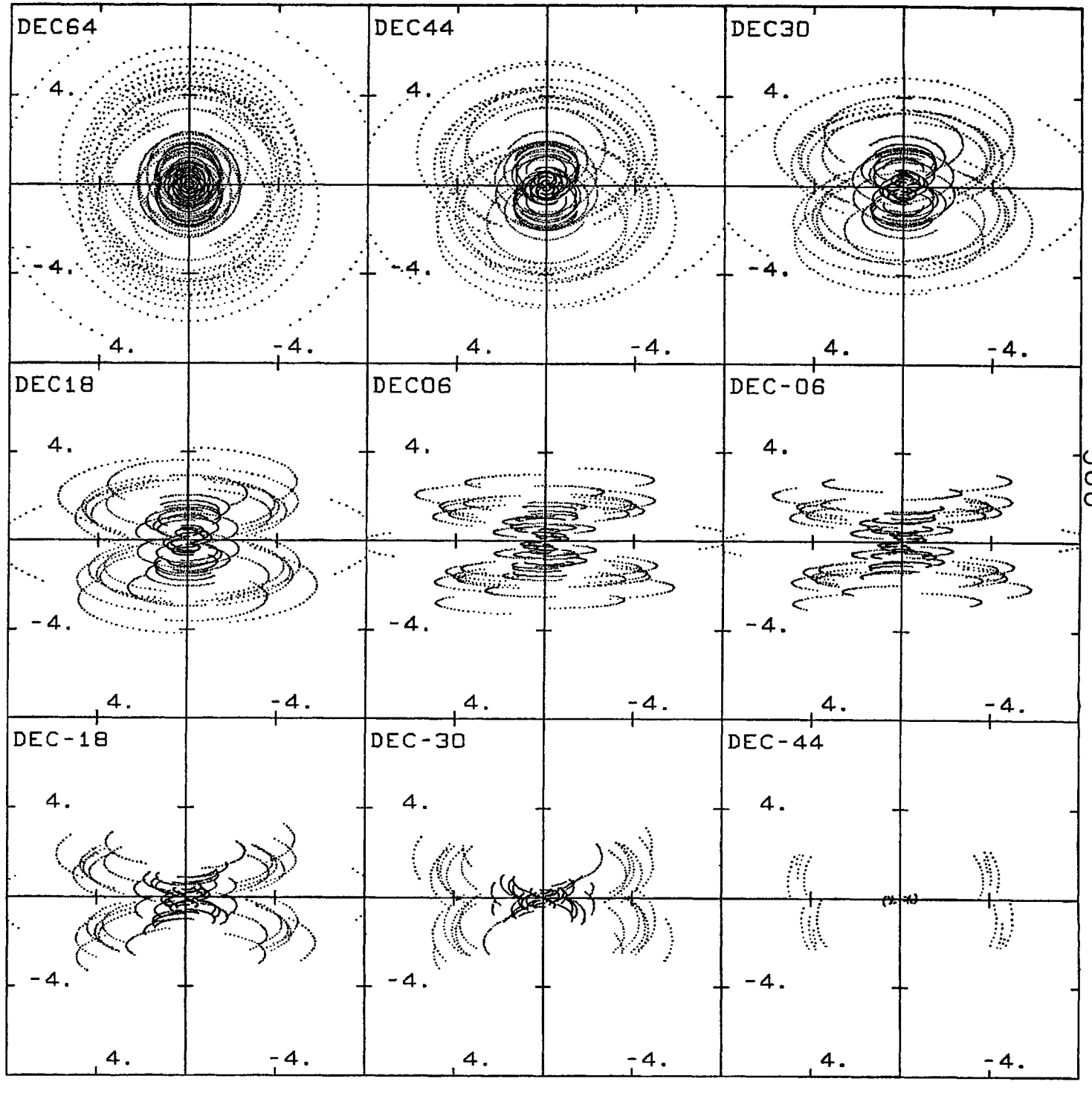

Figure 7

PIETOWN	34.33	108.14
KITT	31.96	111.60
LASL2	35.81	106.27
OROVILE	48.90	119.75
FDUSNEW	30.47	103.95
ARECIBO	18.34	66.75
IOWA	41.58	91.57
OVRO	37.05	118.28
HAWAII	19.80	155.50
HSTK	42.43	71.49

Scale in km
: kilometers x 10^3)

8000 Km

Full VLBA

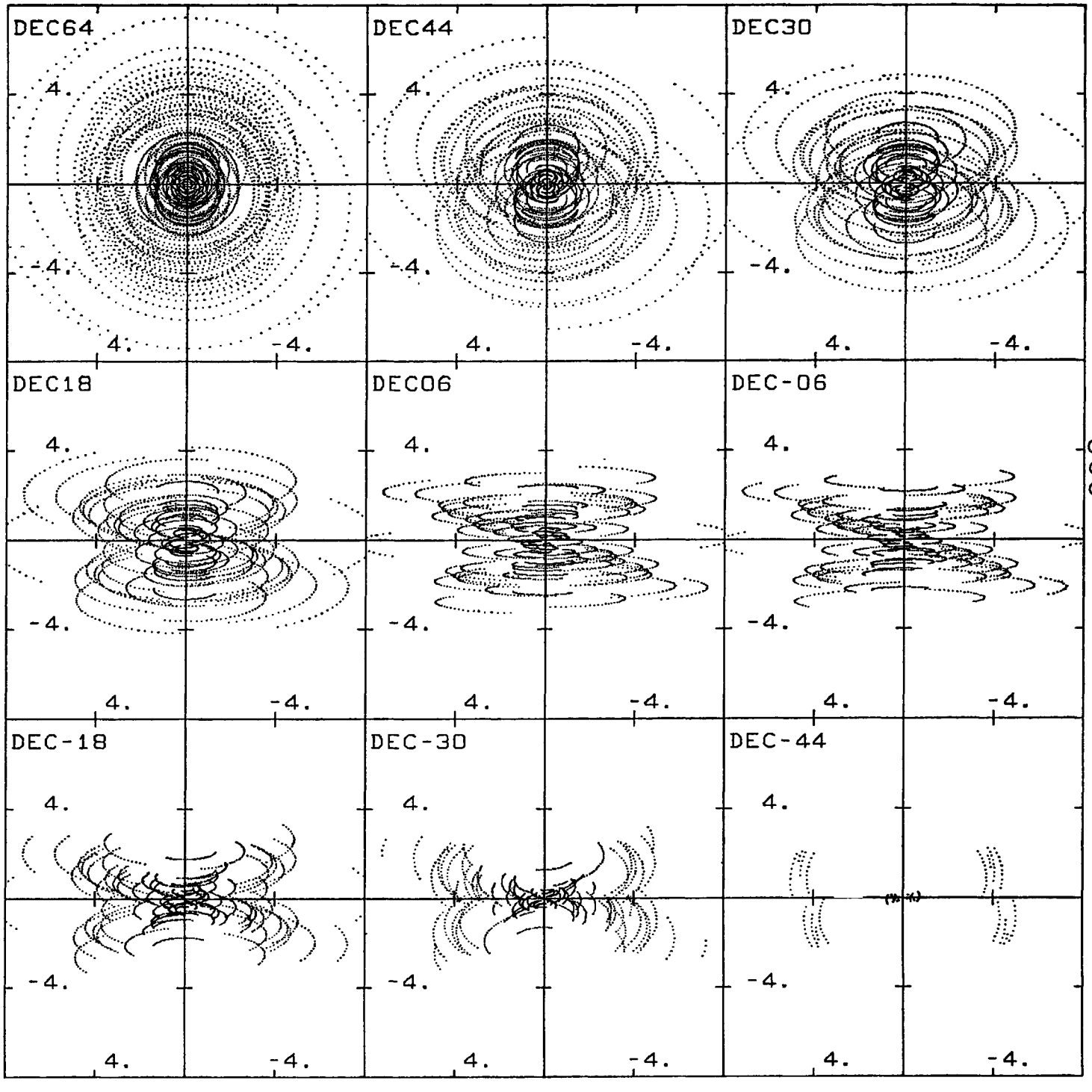

Figure 8