Western Region Technical Attachment
No. 90-25
July 17, 1990

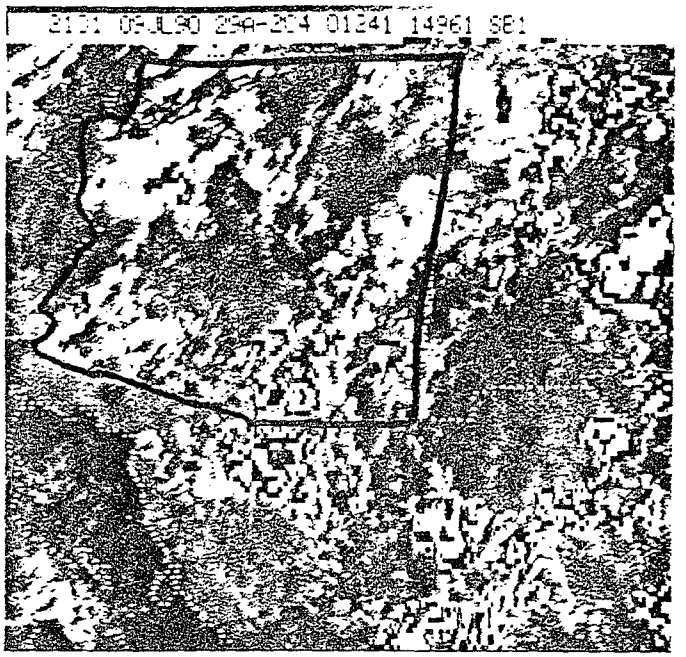
EXAMPLE OF ARC-CLOUD INTERACTION

In an atmosphere which is moist and convectively unstable, it may be obvious that thunderstorms will form somewhere within a certain region. However, predicting exactly where they will form within that region is often very difficult. Forecasters look for focusing mechanisms such as fronts, dry lines, sea/lake breezes, and orographic features.

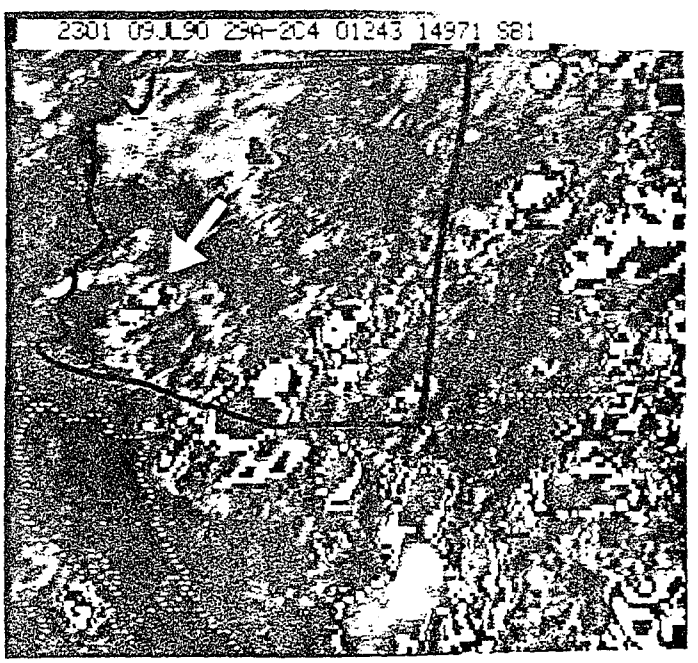
One of the more subtle, but equally important focusing mechanisms are outflow boundaries from previous convection. Careful analysis of satellite imagery, especially visible imagery, can often reveal these boundaries, and animation of this imagery is very helpful in determining where and when they might intersect. Sometimes an old outflow boundary can be a focus for new convection by itself, especially if it moves into a more unstable area.

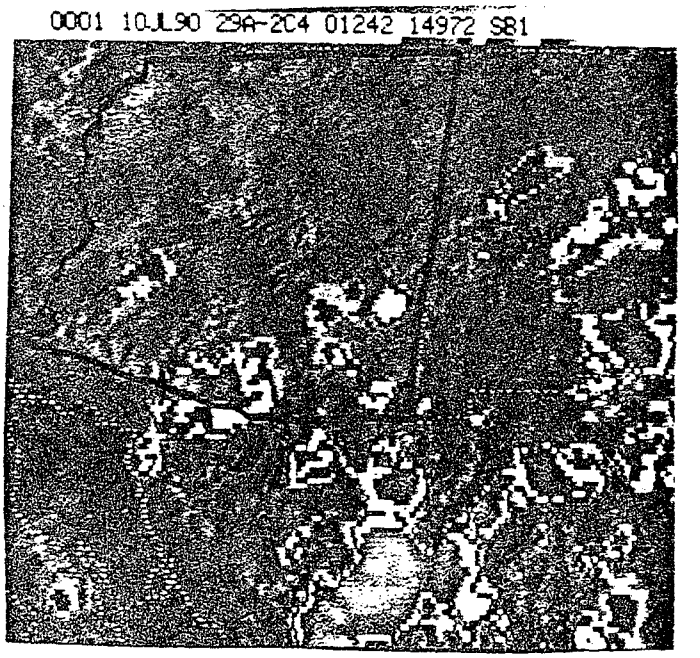
The following set of satellite images is an excellent illustration of the importance of intersecting outflow boundaries in the initiation of new convection. At 21Z on July 9, 1990, there is scattered weak convection over southwest Arizona. By 22Z, subsidence is occurring in two distinct locations (likely due to dissipation of some of the earlier convection) and the boundaries of the outflow associated with these areas can be seen clearly as convective towers develop in arced lines (see arrows). Both boundaries were moving to the north. By 23Z, more significant convection has begun to develop at the intersection of the two boundaries (see arrow), which are still clearly defined. By 00Z, the thunderstorm which formed at the intersection of the boundaries is beginning to weaken, but the boundaries can still be seen.

In this case, the convection that developed at the intersection of the boundaries was not particularly strong (many other factors would have suppressed it), nevertheless its location and probably its mere existence can be attributed to the intersecting outflow boundaries. In this example, identification of outflow boundaries is relatively easy, in other situations the boundaries may be much more subtle.


2101 09JL90 29A-2C4 01241 14961 S81

2201 09JL90 29A-2C4 01241 14962 S81


2301 09JL90 29A-2C4 01243 14971 S81


0001 10JL90 29A-2C4 01242 14972 S81