Space Time Visualisation of Police Incidents

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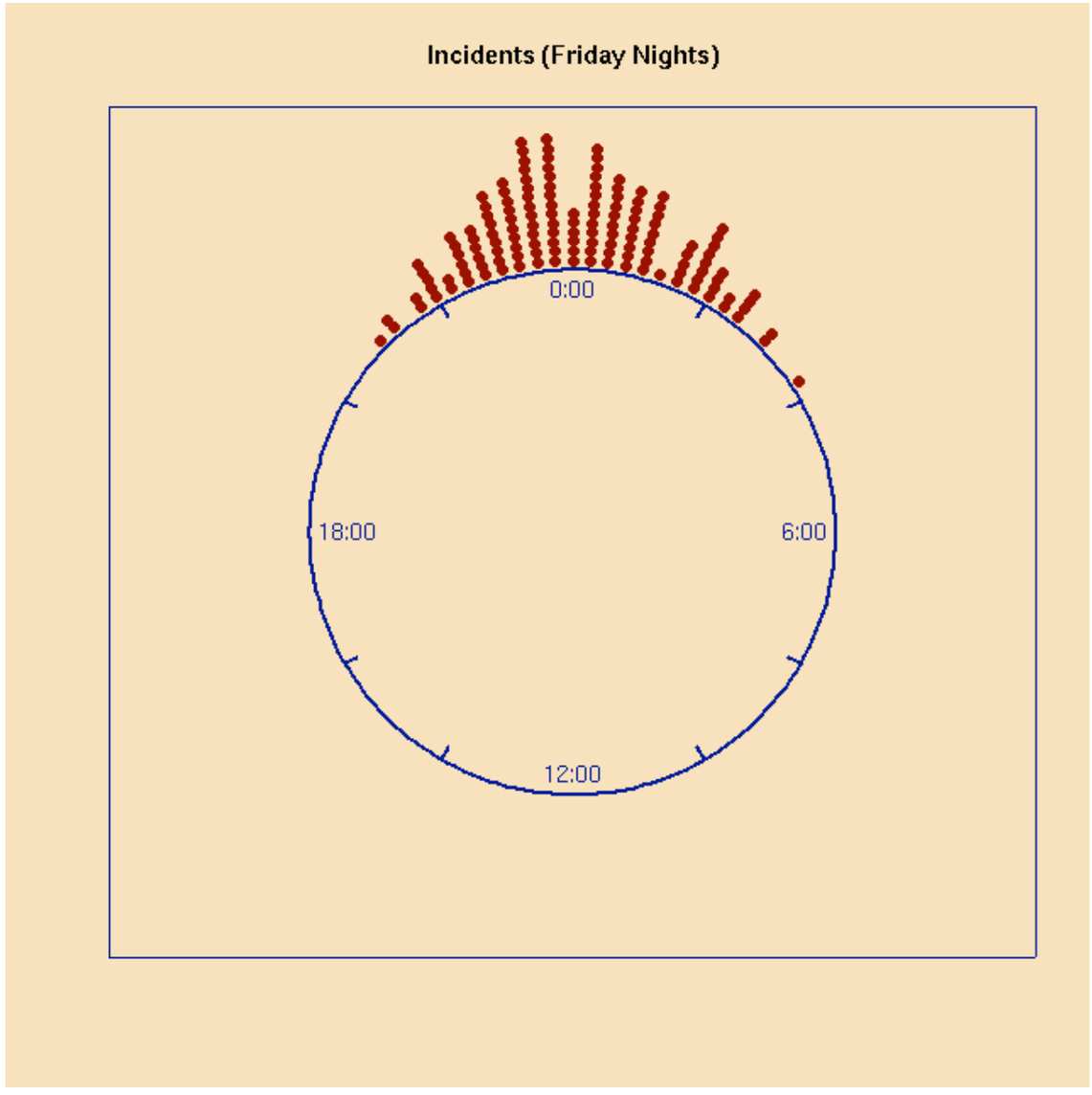
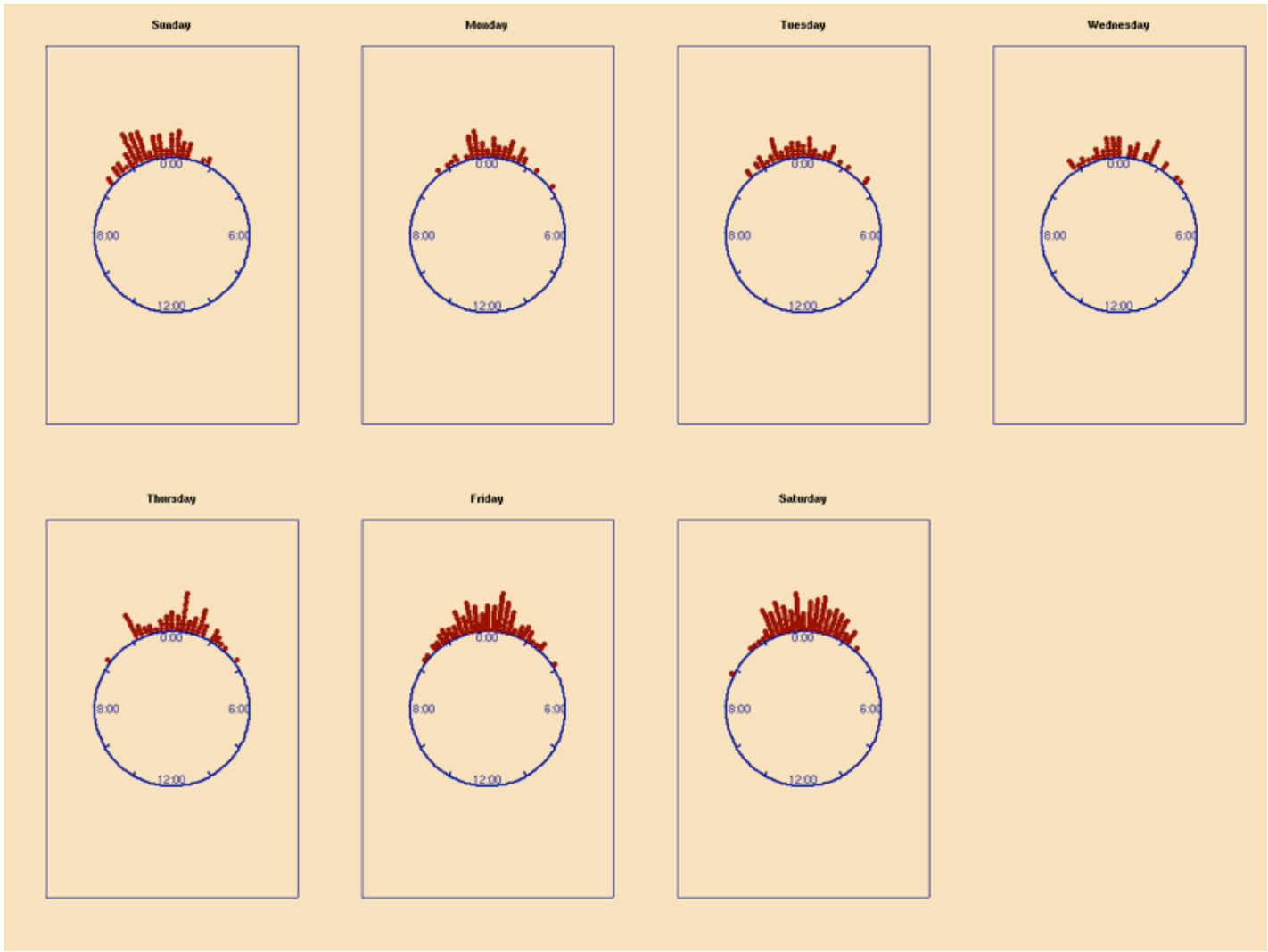
Disturbance Call-Outs

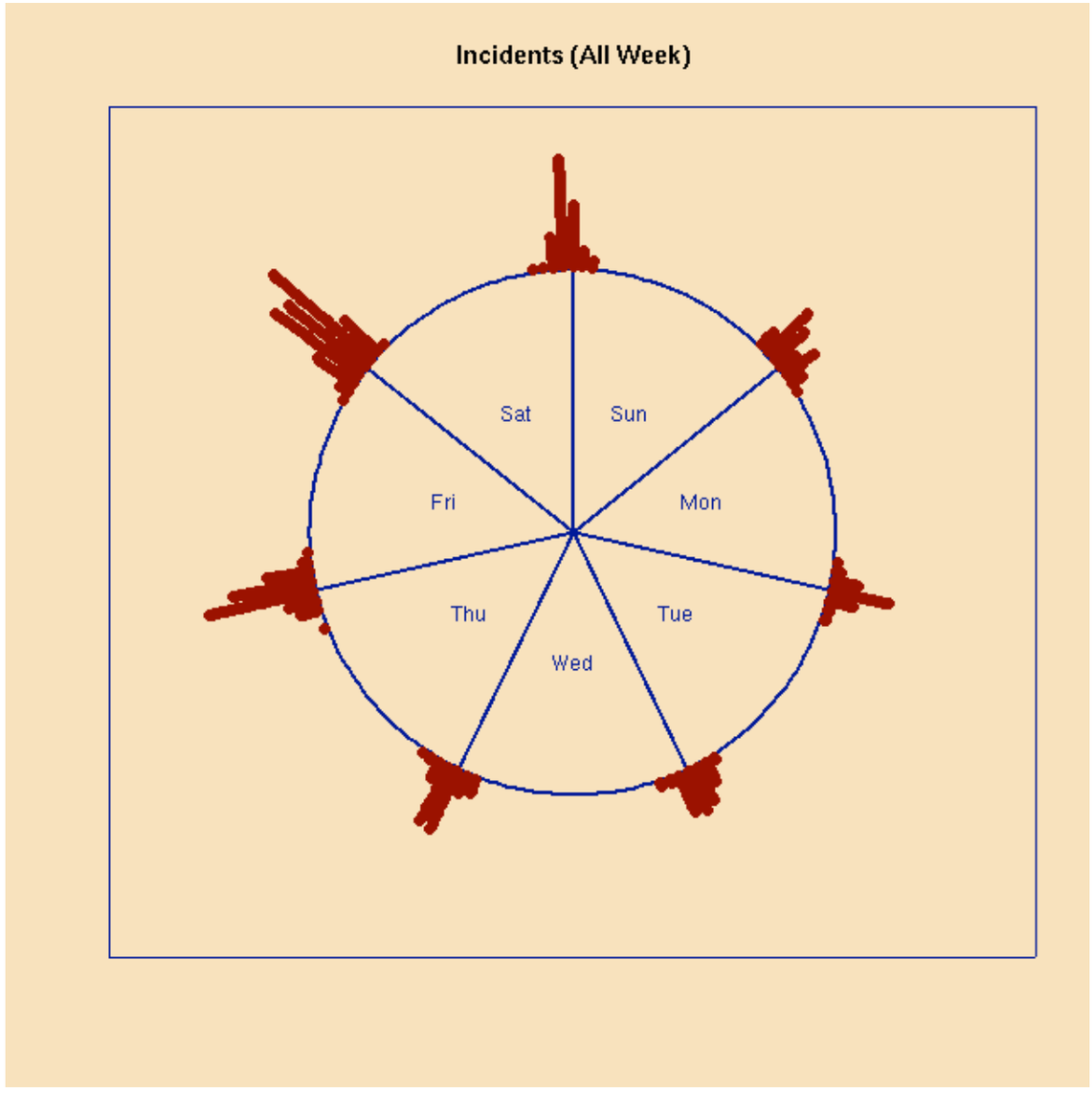
- Examining a particular type of crime and its daily and weekly cycles.

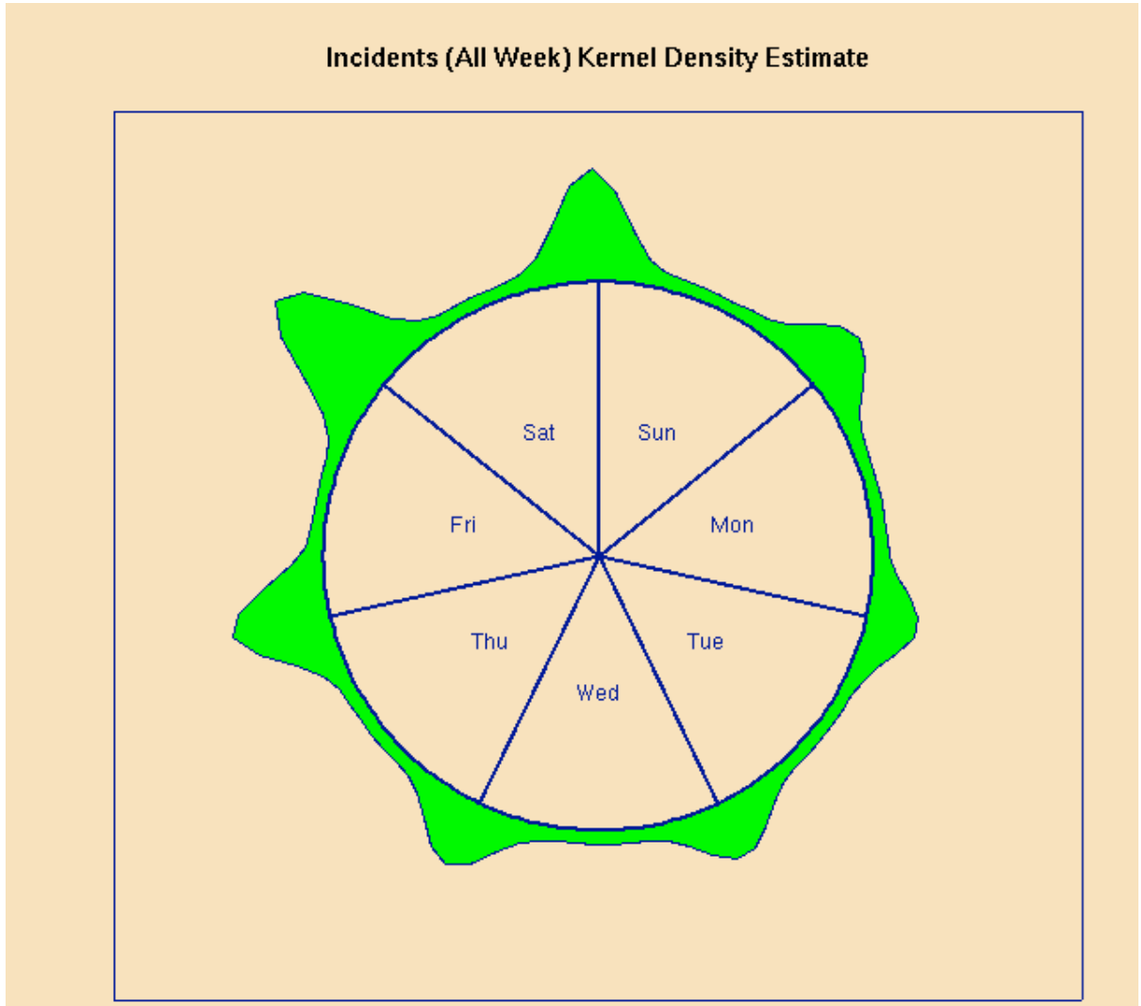
Location and time both important ...

- Police location needs to match disturbance location
- Different places are likely start-points for public order problems at different times of day...

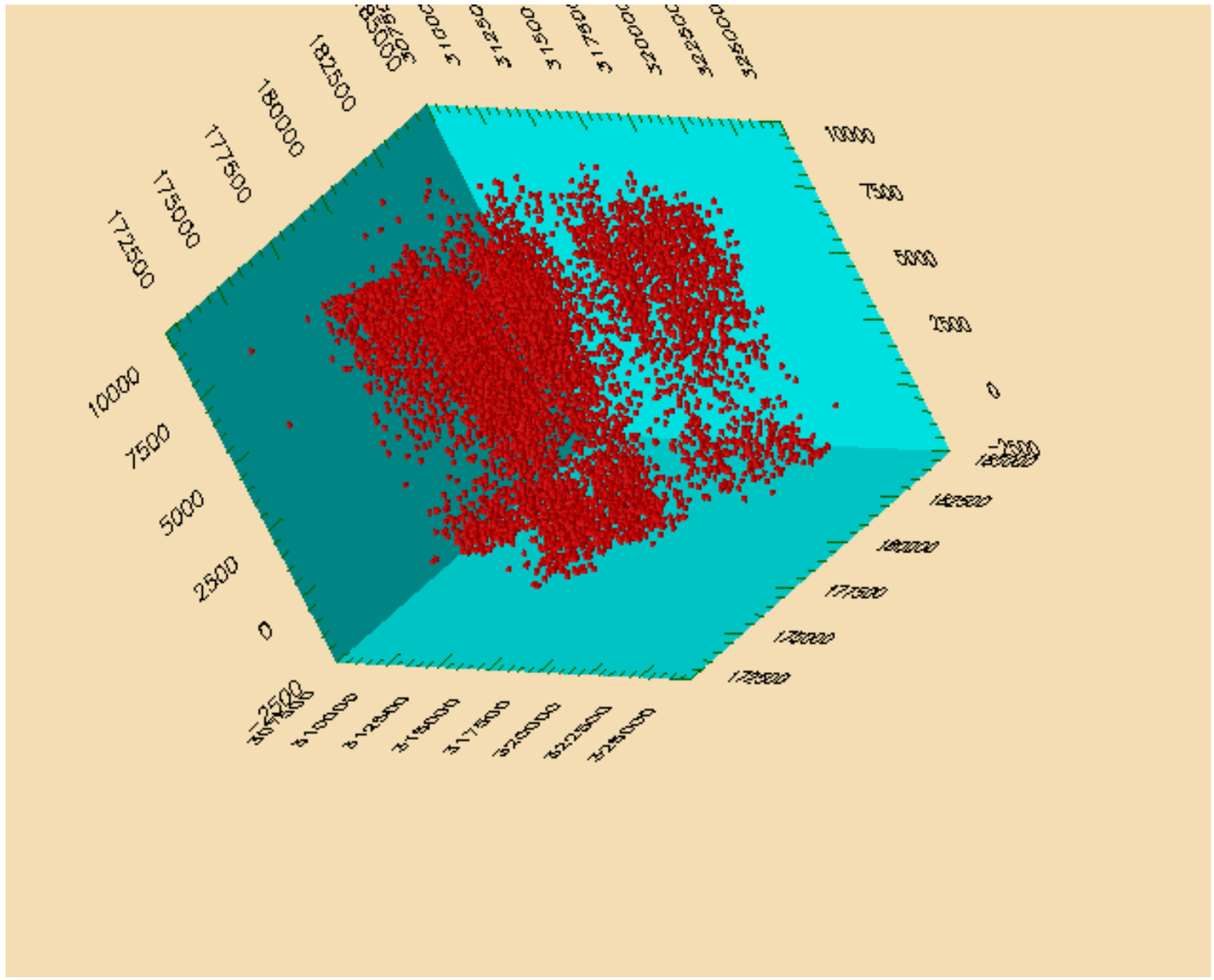

Incidents (Friday Nights)
0:00
6:00
12:00
18:00


Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
0:00
6:00
12:00
18:00

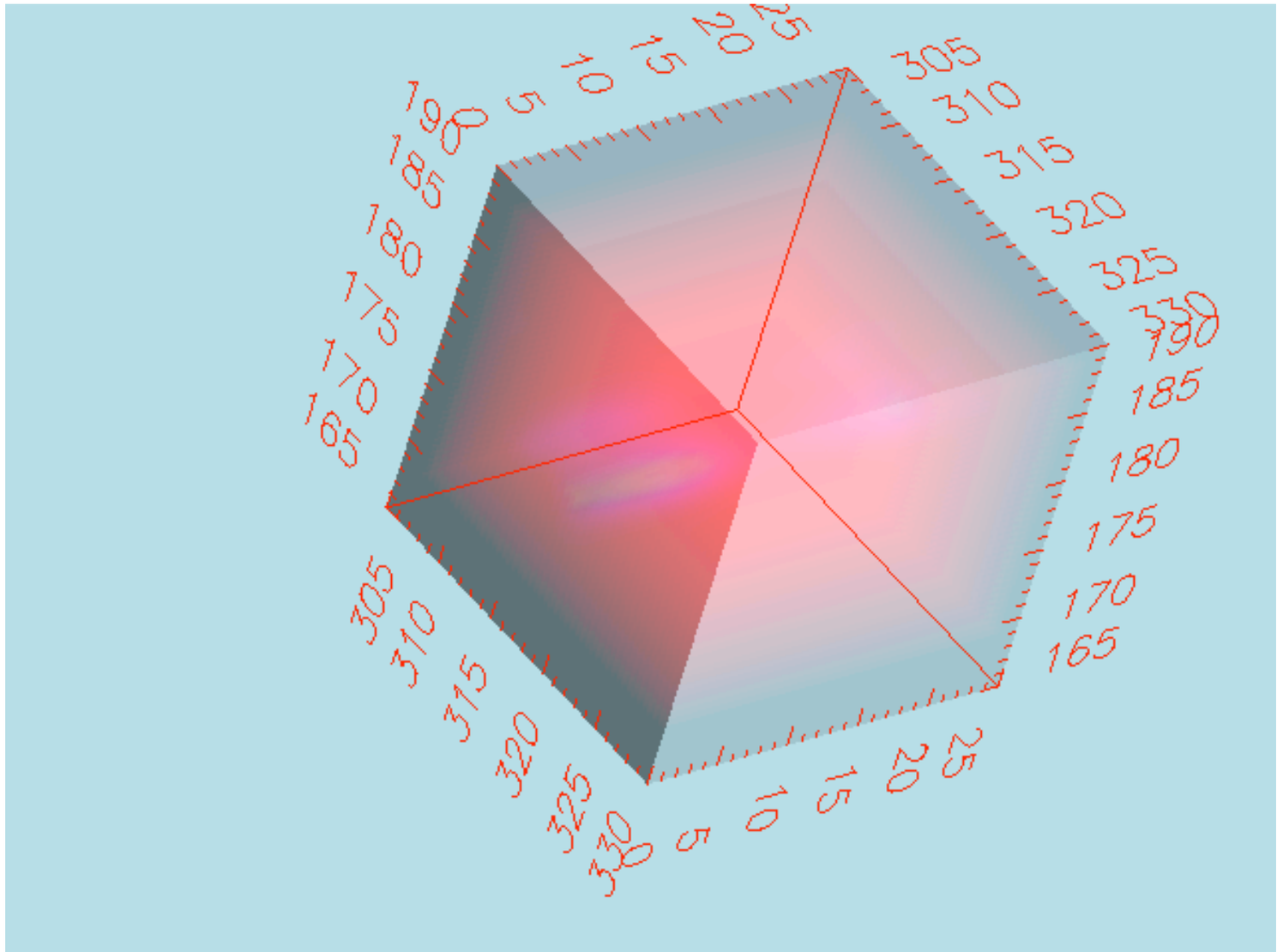

Incidents (All Week)
Sat
Sun
Fri
Mon
Thu
Tue
Wed


Incidents (All Week) Kernel Density Estimate
Sat
Sun
Fri
Mon
Thu
Tue
Wed

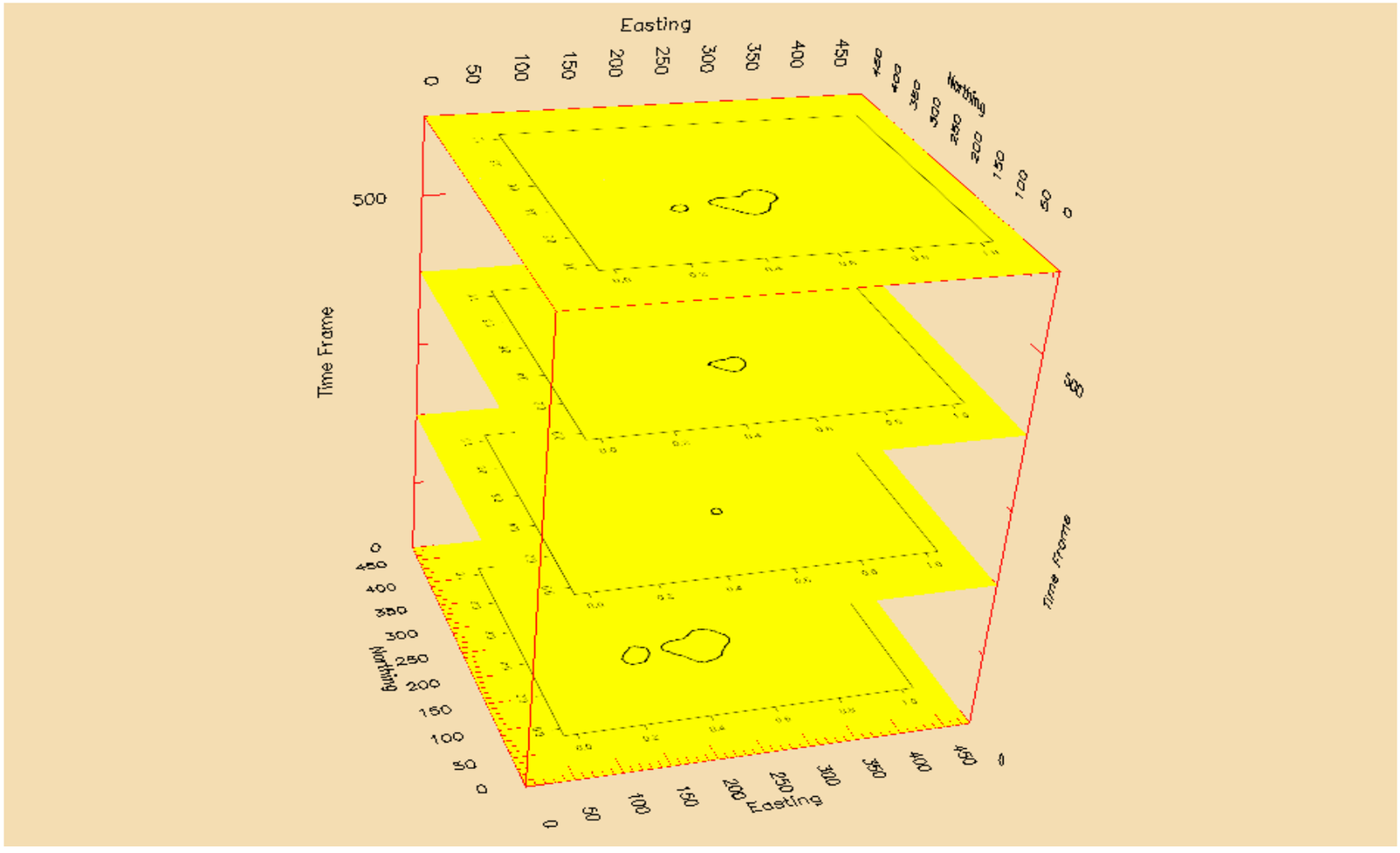
The Point Pattern in Space and Time



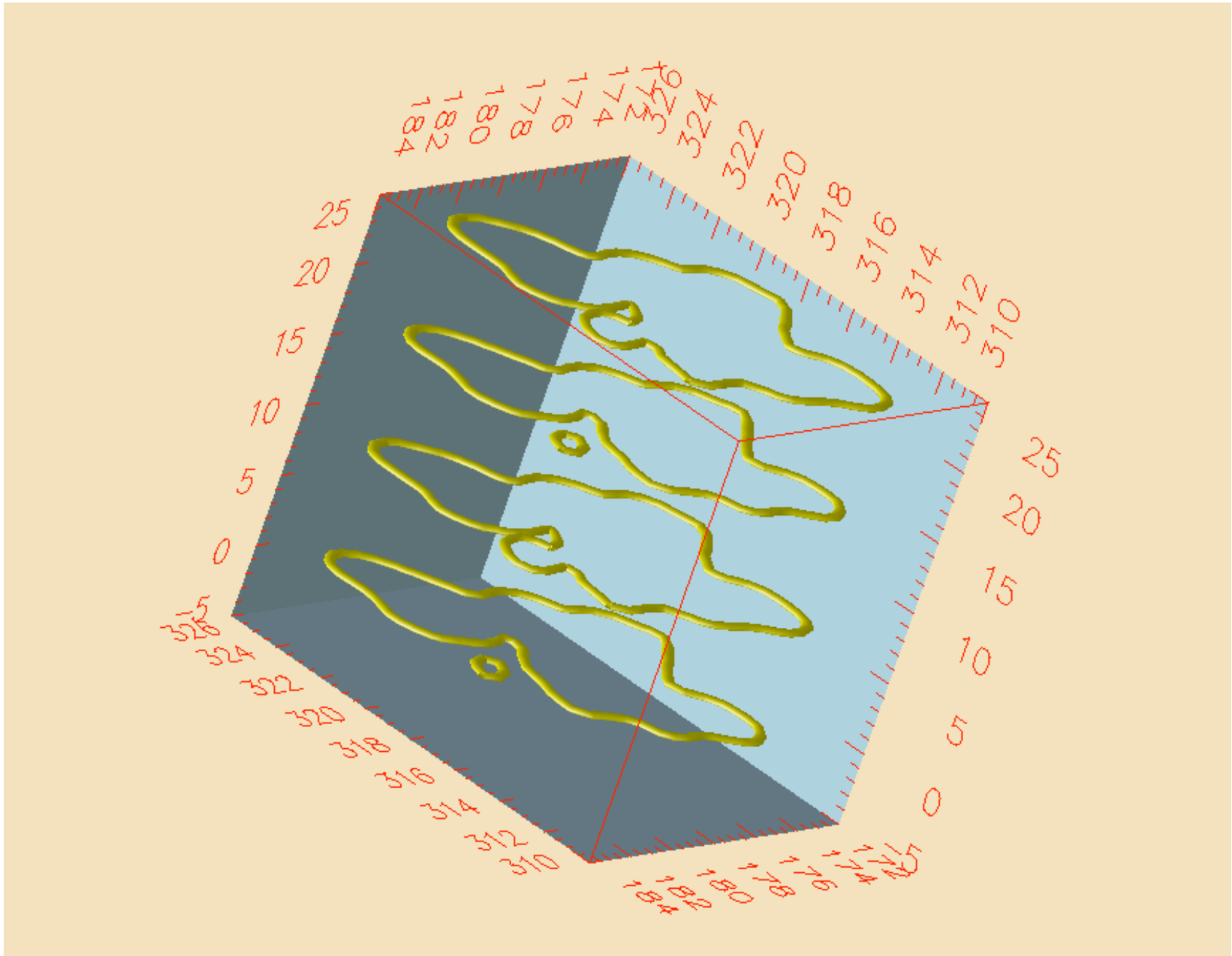
Smoothed visualisation



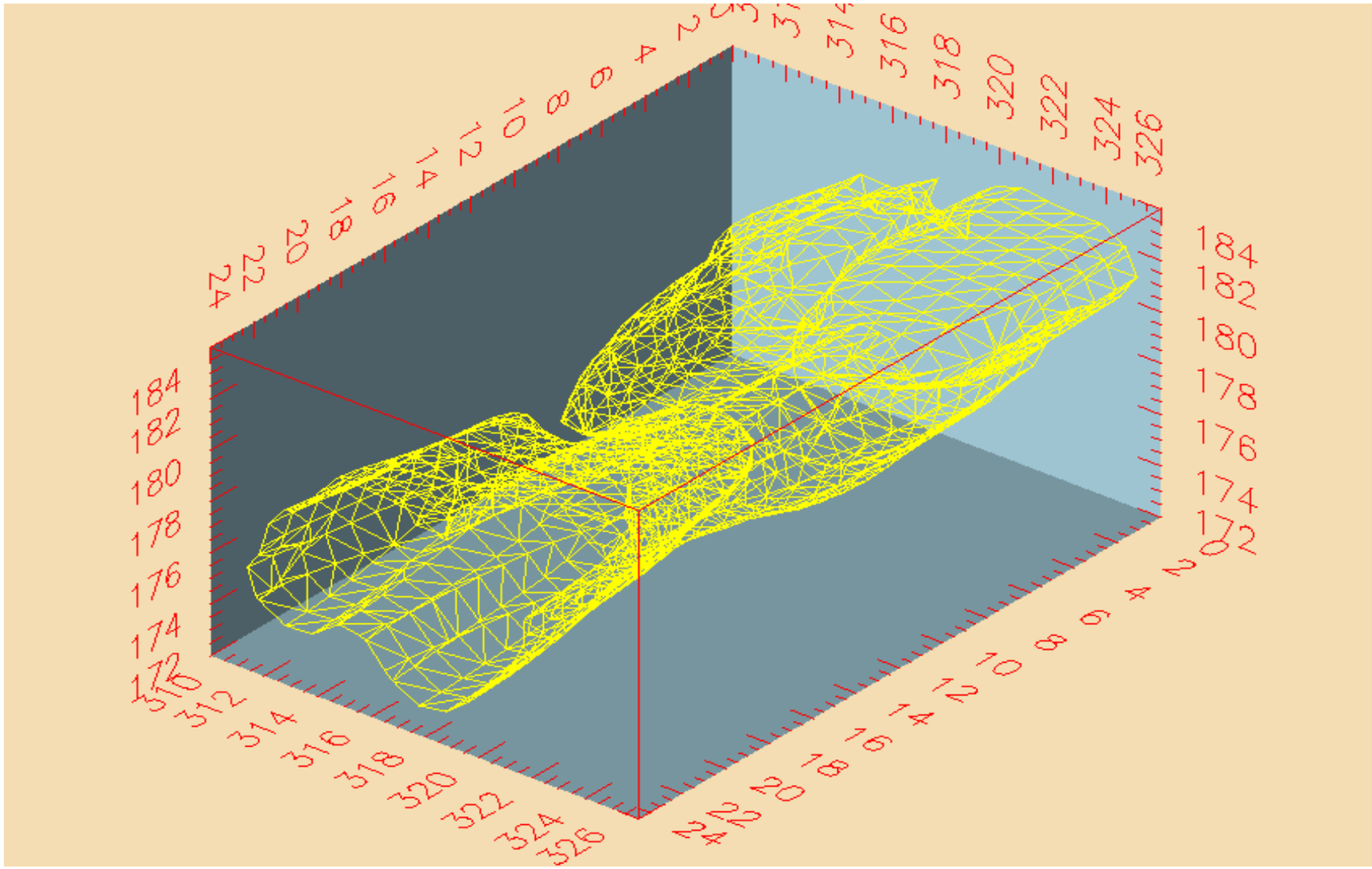
Isosurfaces – extending risk map in time



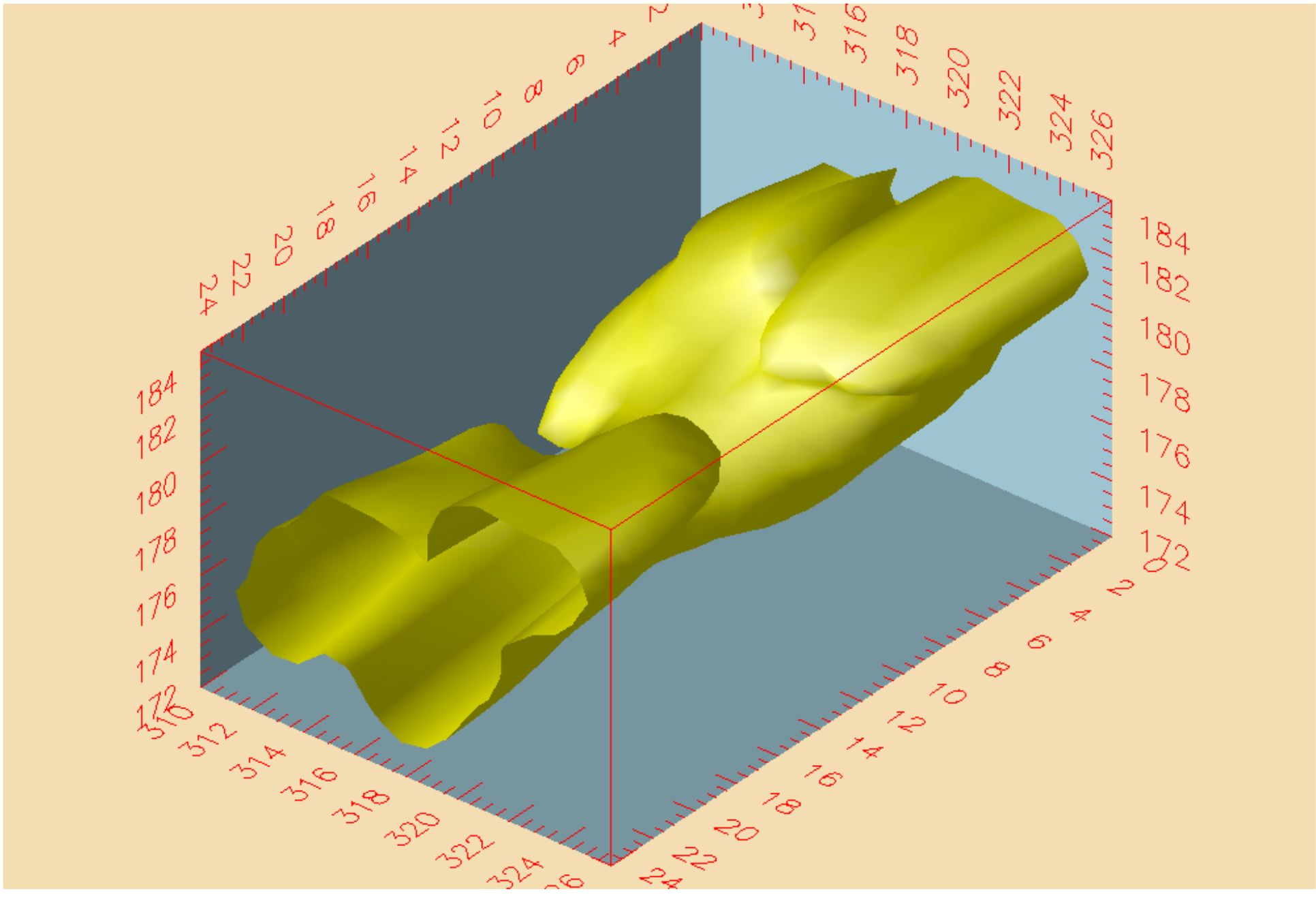
Consider the contours ‘floating’ in spacetime

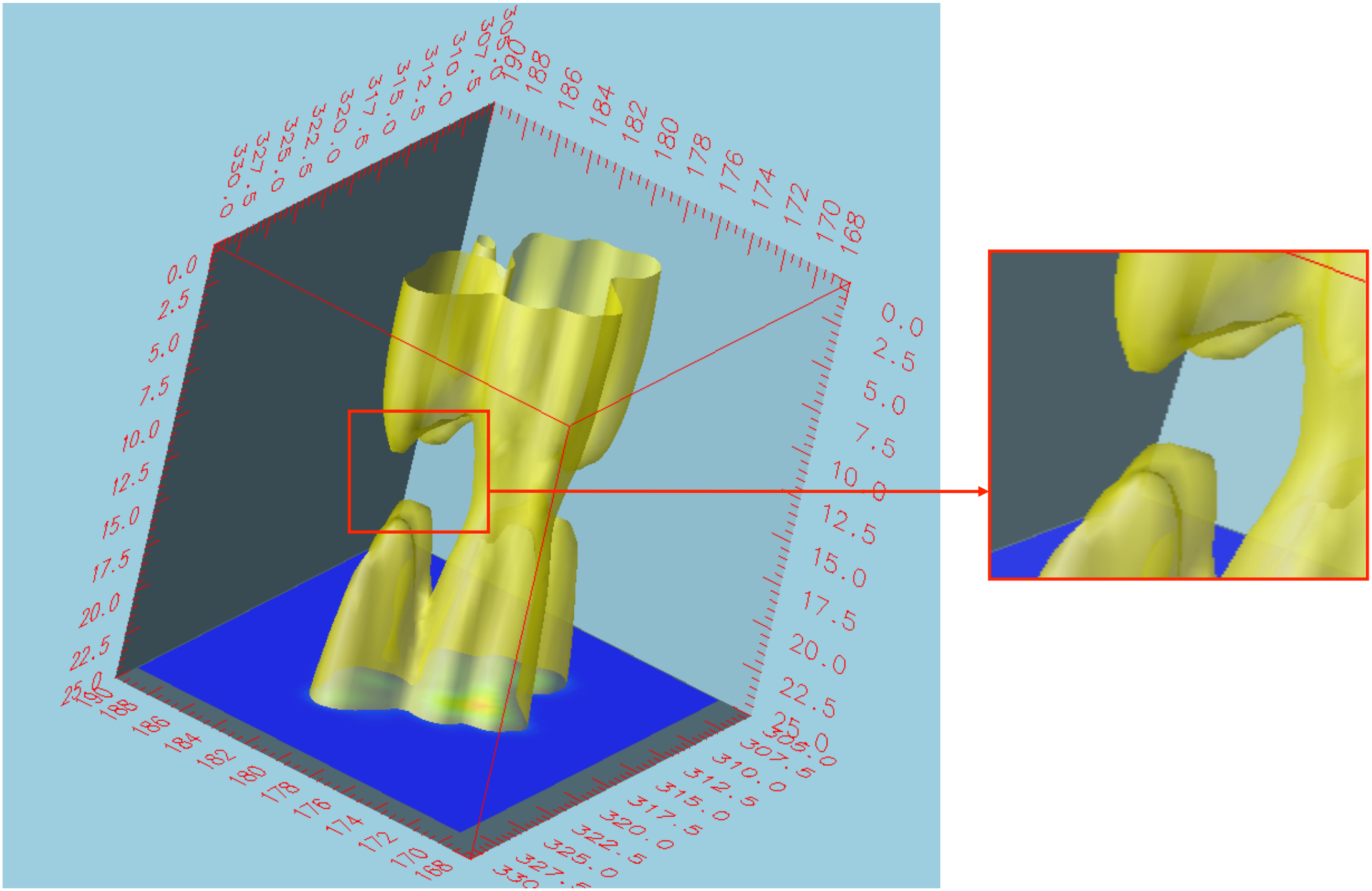


Join them up – obtain a 2D surface in 3D space



Finally – fill out the wire frame to get the surface…





Isosurfaces in practice

- OpenDX – IBM open source software for scientific visualization
- Analyst needs to be able to interact with the isosurface – and see associated risk maps for any given time-slice (snaphot)

Image: /home/chris/Research/Time of Day (Crime)/Visualise2/daypat3.net

File Execute Windows Connection Options Help

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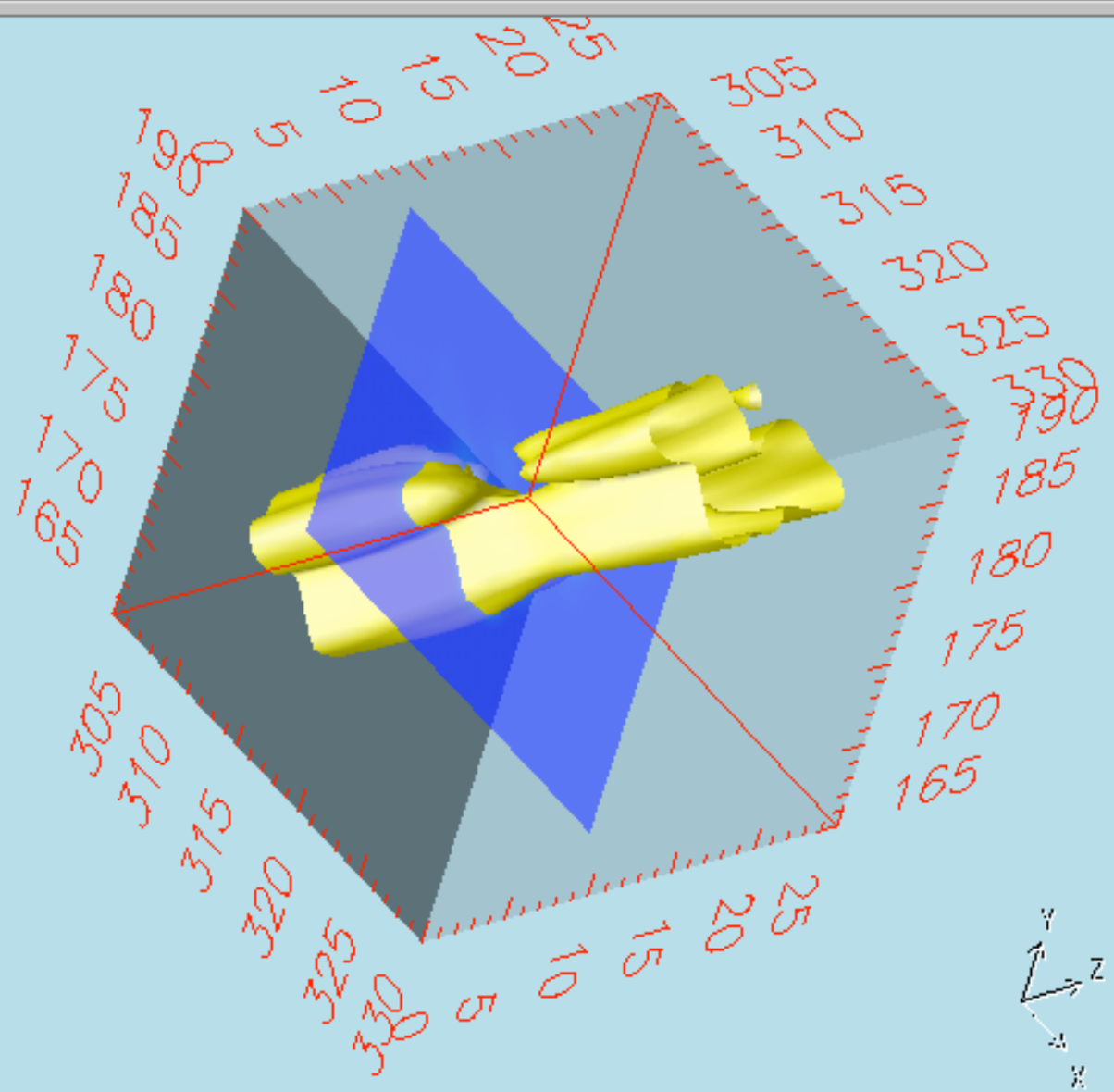
cute Windows Connection Options Help



Visualisation Parameters

Isosurface opacity

1.00

Time of Day

9

Isosurface Value

0.002

reset image camera

reset isosurface value

Close

Help

Wastebasket

Further Extensions...

- Representing disorder using VR

Further Reading ....

Brunsdon, C., Corcoran, J. and Higgs, G. (2007) 'Visualising Space and Time in Crime Patterns: A Comparison of Methods', Computers, Environment and Urban Systems, 31, 52-75.

Craglia, M., Haining, R., Wiles, P. (2000) 'A Comparative Evaluation of Approaches to Urban Crime Pattern Analysis', Urban Studies, Vol 37(4), 711-729

Corcoran, J., Higgs, G., Brunsdon, C. and Ware, A. (2007) 'The use of co-maps to examine the spatial and temporal dynamics of fire incidents: A case study in South Wales, UK', Professional Geographer, 59(4), 522-537.

Corcoran, J., Higgs, G., Brunsdon, C., Ware, A. and Norman, P. (2007) 'The use of spatial analytical techniques to explore patterns of fire incidence: A South Wales case study', Computers, Environment and Urban Systems, 31, 623-647