Clarke's novae

From Winch:

In his 1968 short story Crusade, Sir Arthur C. Clarke notes that in the last half-century, almost one-quarter of the brighter novae have occurred in one tiny region of the sky: the constellation Aquila.

This is used as evidence that Something Awful is coming our way, triggering novae to snuff out inhabited planets.

Is it true about one quarter of the novae from circa 1930 to circa 1970 being in the constellation of [Aquila]?

Analysis

```
In[2]:= stars = AstronomicalData["NakedEyeStar"];  

In[3]:= Length[stars]
Out[3]= 8910

In[4]:= stars2 = Select[stars, AstronomicalData[#, "ApparentMagnitude"] <= 6 &];

In[5]:= Length[stars2]
Out[5]= 5185

In[6]:= data = {AstronomicalData[#, "Name"],  
                   AstronomicalData[#, "RightAscension"],  
                   AstronomicalData[#, "Declination"],  
                   AstronomicalData[#, "DistanceLightYears"]} & /@ stars2;

Plot of all naked stars for reference. Note the cyclic concentration; that’s just the galactic plane.

In[7]:= ListPlot[  
    Tooltip[{#[[2]], #[[3]]}, #[[1]]] & /@ data,  
    AxesLabel -> {"α [h]", "δ [°]"}, PlotStyle -> PointSize[0.001]]
```

Novae list from CBAT List of Novae in the Milky Way:

```
In[25]:= novaeData = Import["~/tmp/novae.csv", "CSV"];  

In[28]:= novae = {#[[1]], #[[2]], #[[3]], #[[4]], #[[5]], #[[6]]} & /@ novaeData;
```
In[10]:  = Length[novae]
Out[10]= 391

In[11]: = allNovae = Select[novae, #[[2]][[1]] \[GreaterEqual] 0 &];

Plot of all novae in the CBAT list.

In[33]: = p1 = ListPlot[Tooltip[#[[3]], #[[4]], #[[1]]] & /@ allNovae,
  AxesLabel -> {"\[Alpha] [\text{h}]", "\[Delta] [\text{\deg}]"},
  PlotRange -> {{0, 24}, {-80, 80}},
  PlotStyle -> Blue]

Plot of specific novae that Clarke referenced.

In[13]: = clarkesNovae = Select[novae,
  #[[2]][[1]] \[GreaterEqual] 1899 \&
  #[[2]][[1]] \[LessEqual] 1936 \&];
In[14]: = Length[clarkesNovae]
Out[14]= 74

Both plots together, with all CBAT novae in blue and Clarke's novae in red. There pretty clearly is no noticeable difference in the distribution; the concentration of the stars around the galactic plane is expected, as is the clump of novae around the galactic core (at roughly 18h, -30\deg). The concentration in Aquila is simply because it happens to be near to the galactic core, with its centroid at about 19.5h, +5\deg.
In[41] := p3 = ListPlot[{{18, -30}},
AxesLabel -> {"α [h]", "δ [°]"}, PlotRange -> {{0, 24}, {-80, 80}},
PlotStyle -> {Gray, PointSize[0.1]}]

Out[41]=

(The size of the spot is simply to make it clear, and is not intended to imply any apparent size.)

In[42] := Show[p3, p1, p2]

Out[42]=

Interactive spherical plot of novae.

In[17] := theta[alpha_] := 2 Pi alpha / 24
In[18] := phi[delta_] := Pi - Pi (delta + 90) / 180
In[19] := theta /@ {0, 6, 12, 18, 24}
Out[19]=
{0, \frac{\pi}{2}, \frac{3 \pi}{2}, 2 \pi}
In[20] := phi /@ {90, 45, 0, -45, -90}
Out[20]=
{0, \frac{\pi}{4}, \frac{\pi}{2}, \frac{3 \pi}{4}, \pi}
In[21] := Hour = 360 Degree / 24
Out[21]= 15 °
In[22] := sphericalToCartesian[rho_, theta_, phi_] :=
{rho Cos[theta] Sin[phi],
 rho Sin[theta] Sin[phi],
 rho Cos[phi]}
In[23]:= First[clarkesNovae]
Out[23]= {V606 Aql, {1899, 4, 21}, 19.34, 0.133333}

In[24]:= Graphics3D[{Opacity[0.5], Sphere[{0, 0, 0}, 0.99], 
Tooltip[Point[sphericalToCartesian[1, theta[[1]], phi[[4]], [[1]]] & @ clarkesNovae]]}