

*MICHIGAN SAS USER GROUP*  
*MAY 19, 2011*

# **Time Contour Plots**

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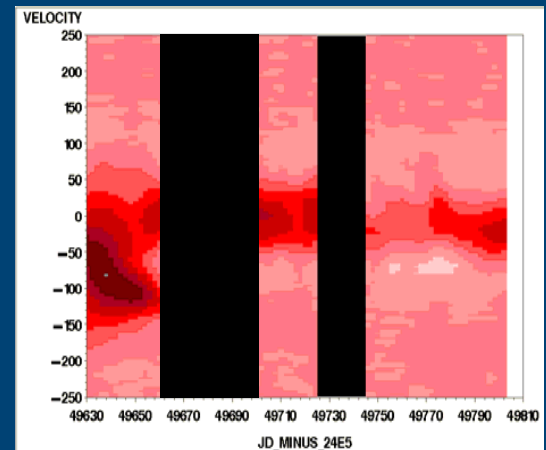


# OUTLINE

**Overview and History**

**Presentation Options**

**Examples**



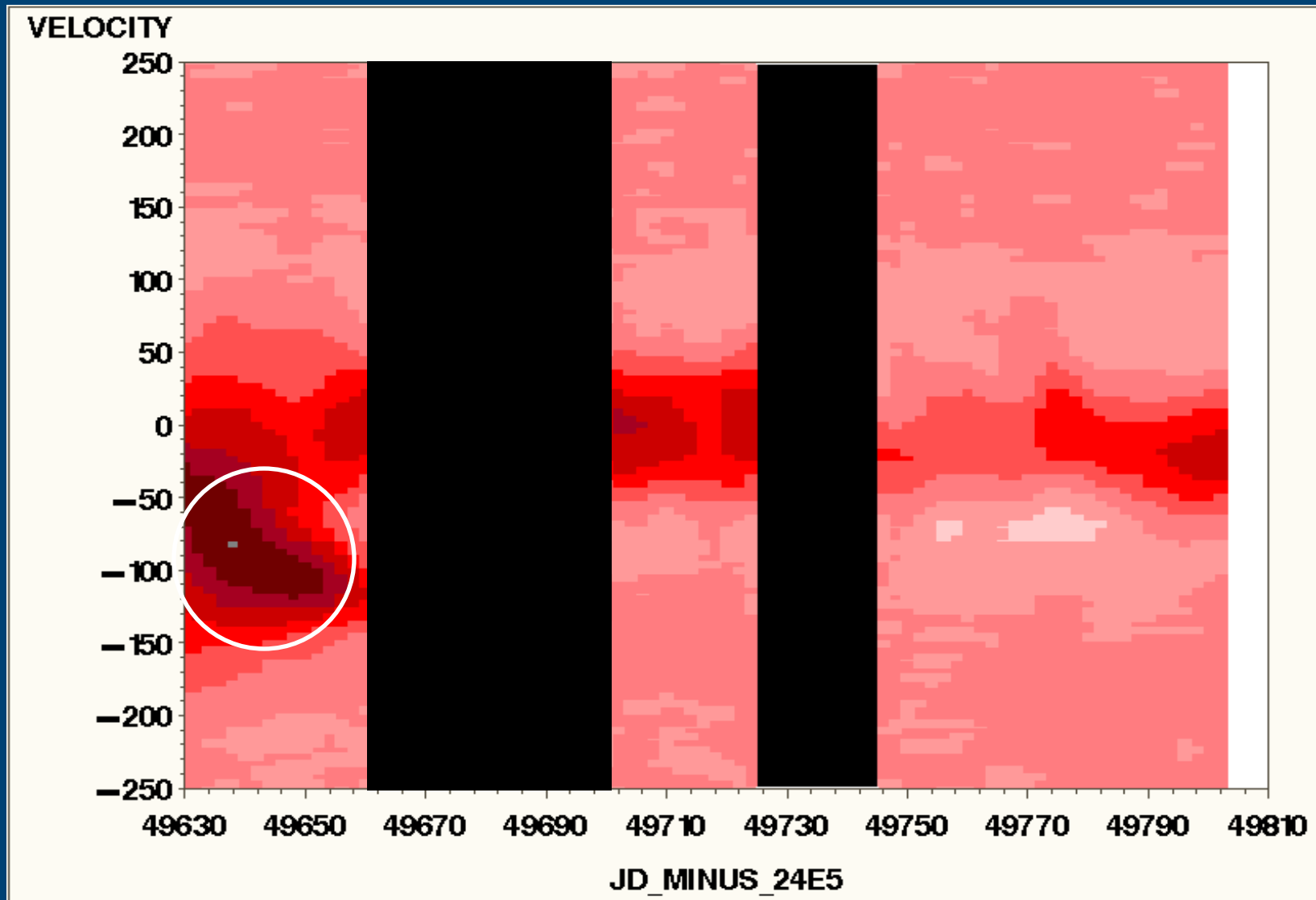
**Creating the Plot**

**Summary**

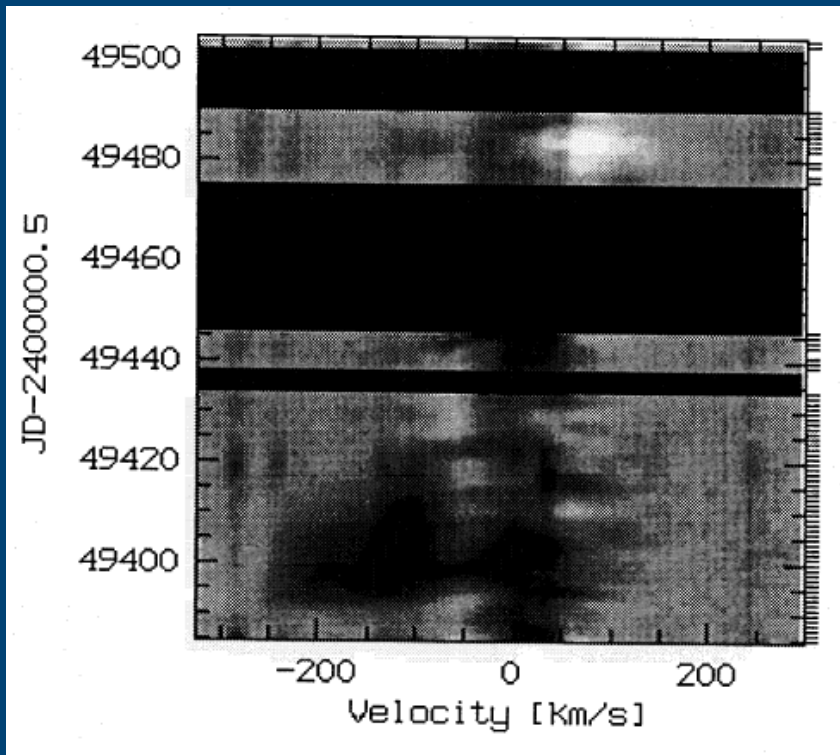
**Questions**



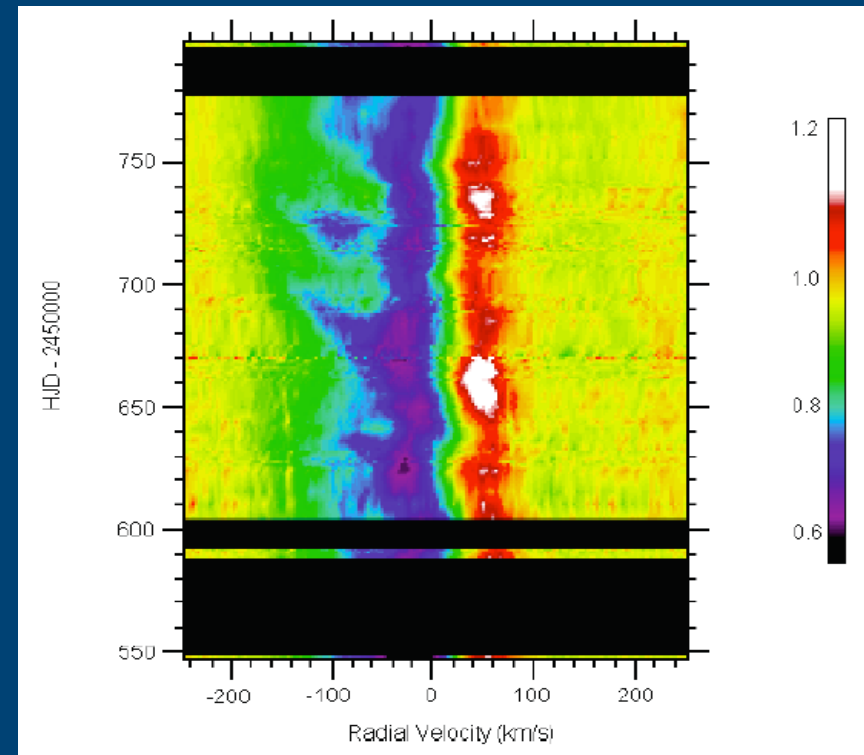
# A Time Contour Plot



# Some Early Examples

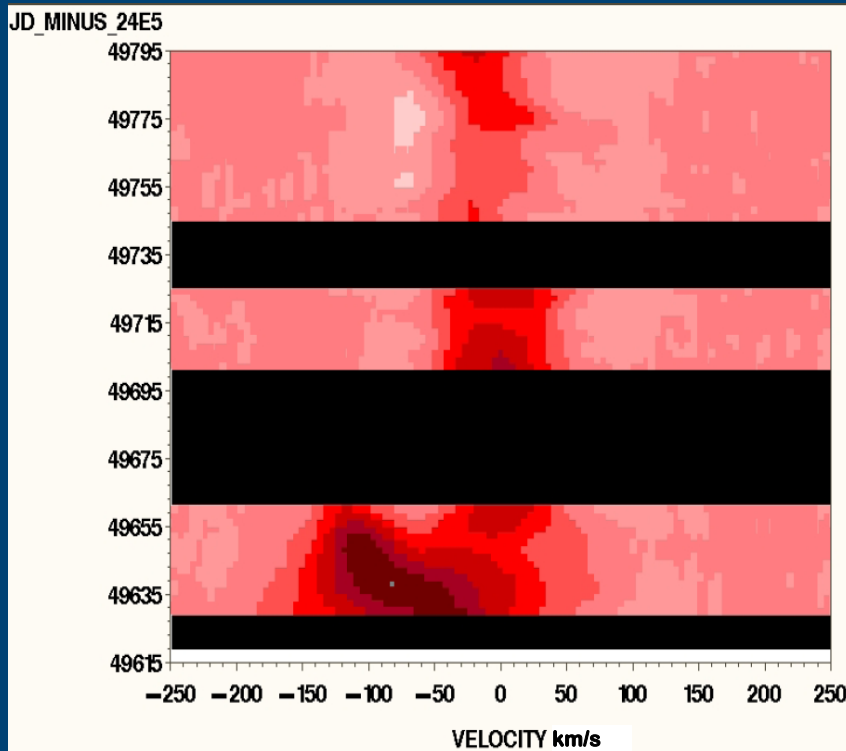


**Kafer, Stahl, Wolf, Gang,  
Gummersbach, Kovacs,  
Mandel, Szeifert  
Astronomy and Astrophysics,  
305, 887 (1996)**



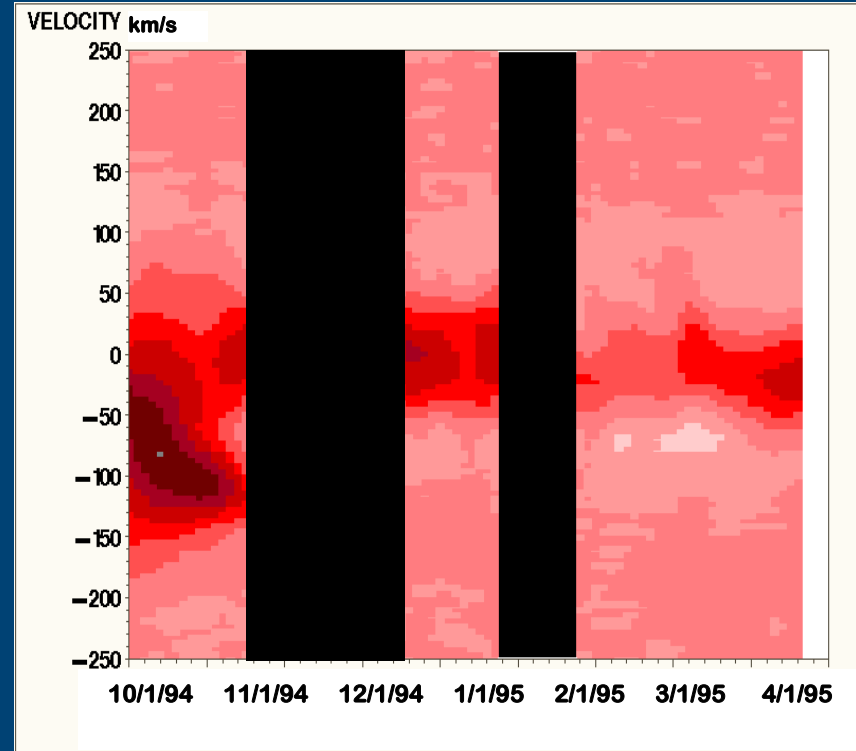
**Richardson  
Master's Thesis  
University of Toledo  
2006**

# Presentation Options



Time on Vertical Axis

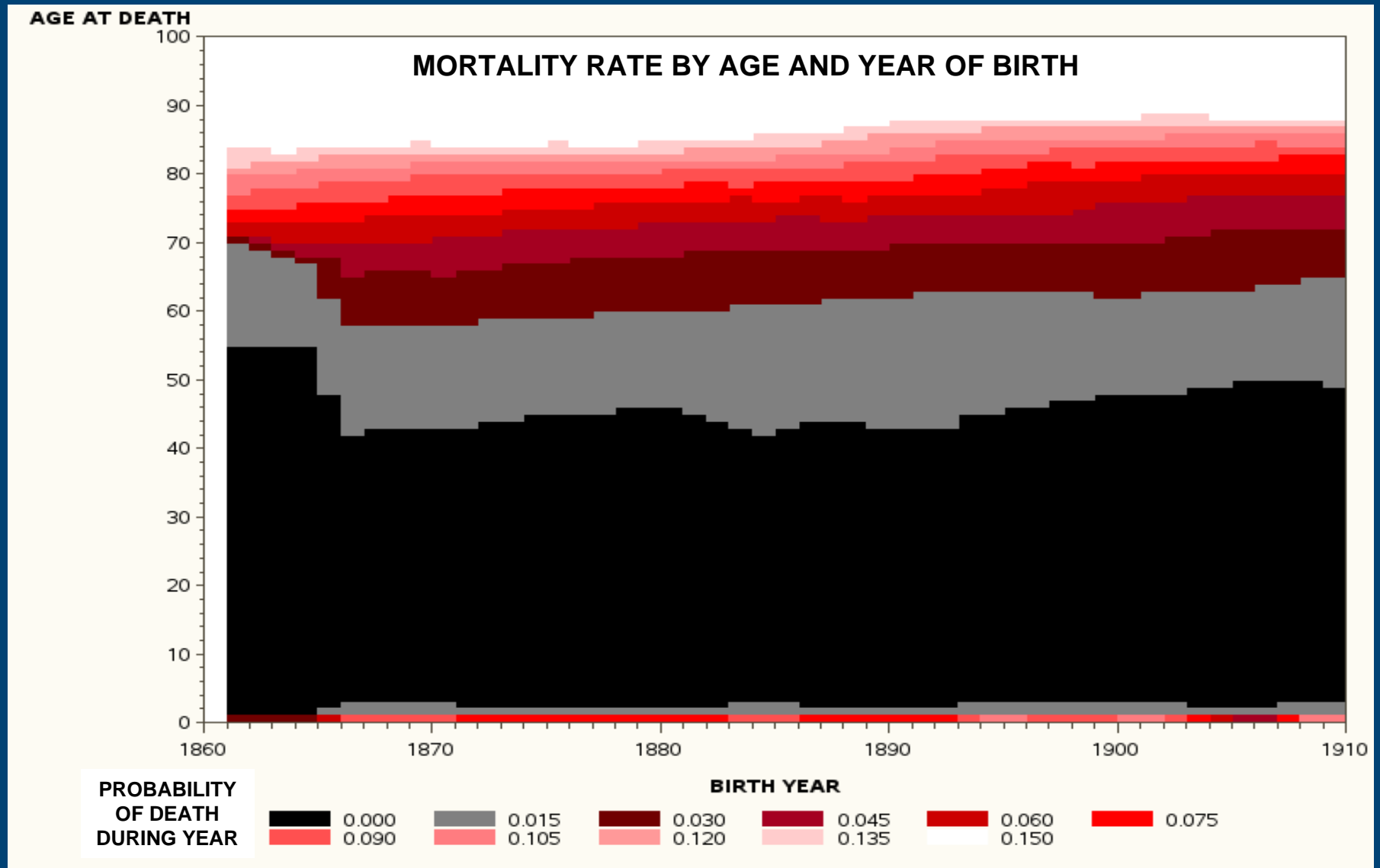
Proportional Date Scale



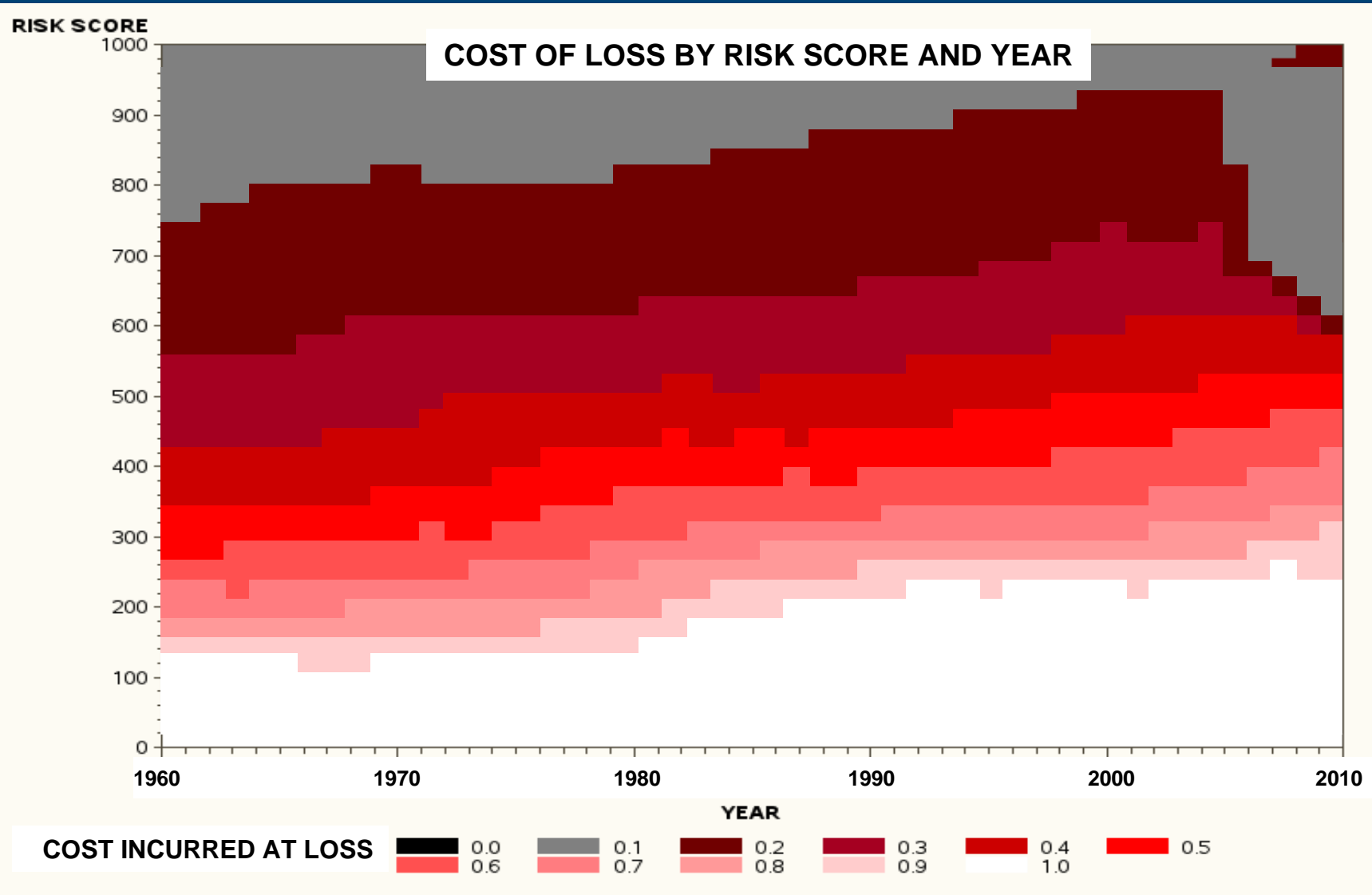
Time on Horizontal Axis

Natural Date Scale

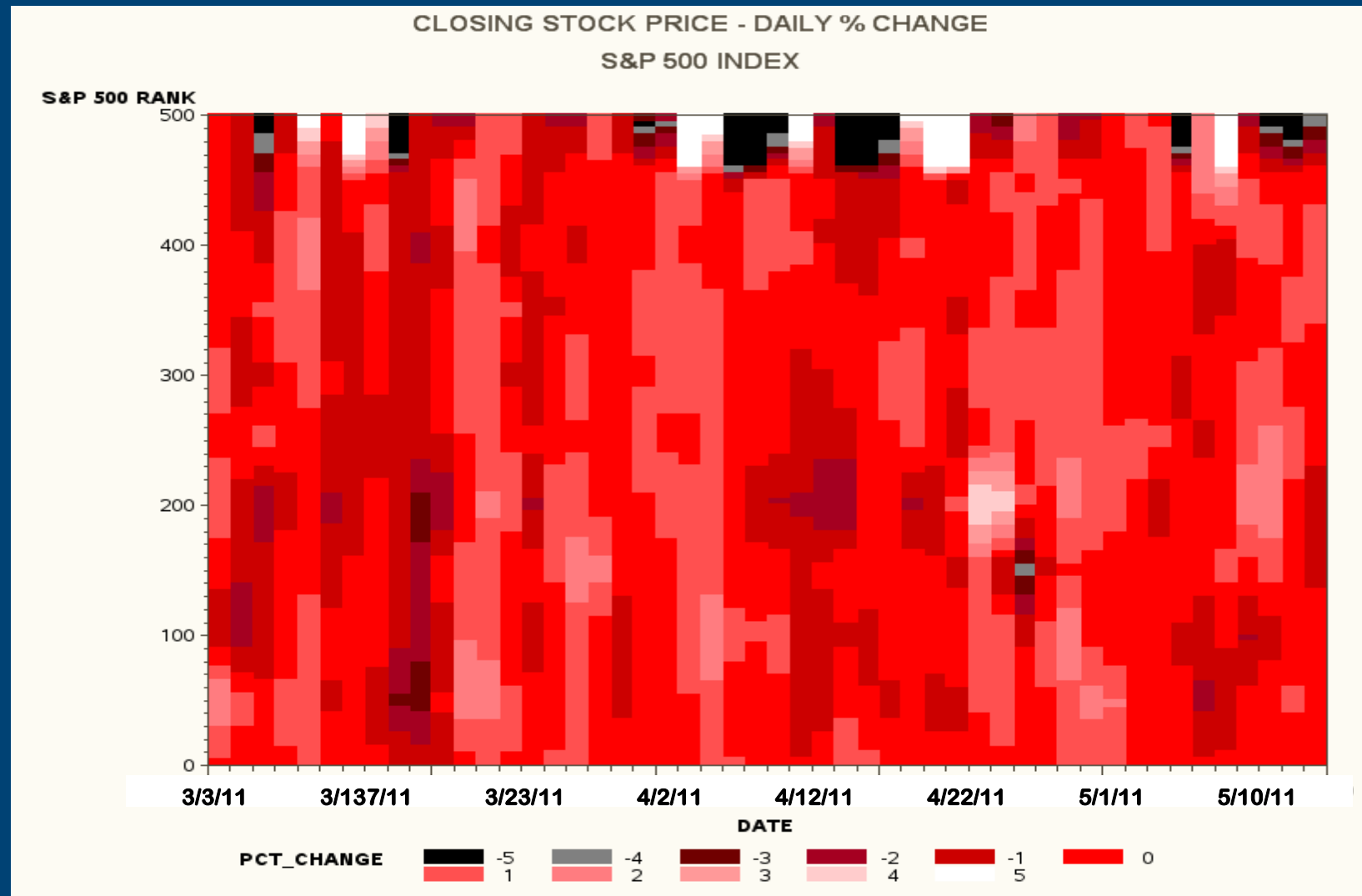
# Example: Biometrics



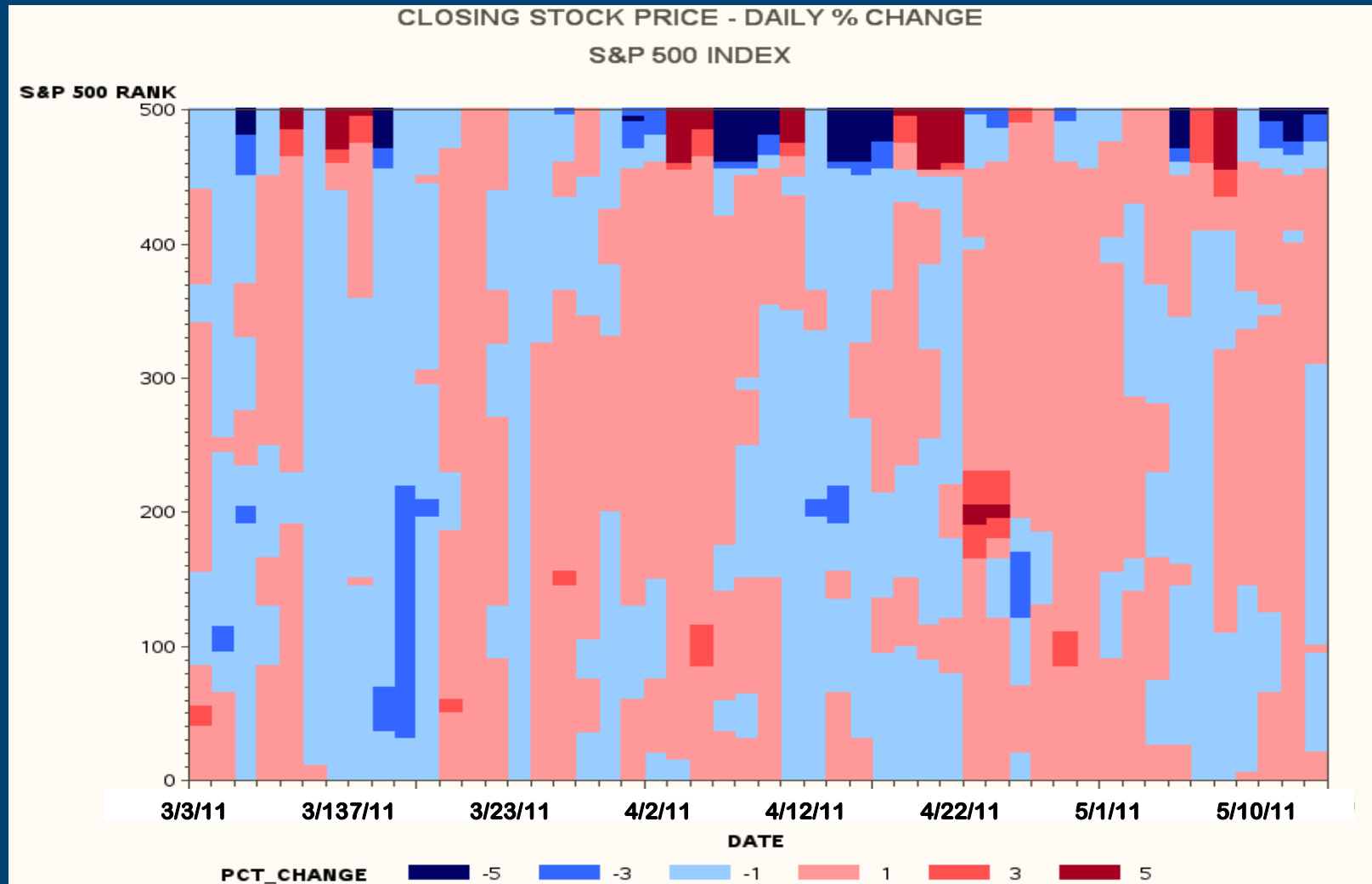
# Example: Risk Analysis



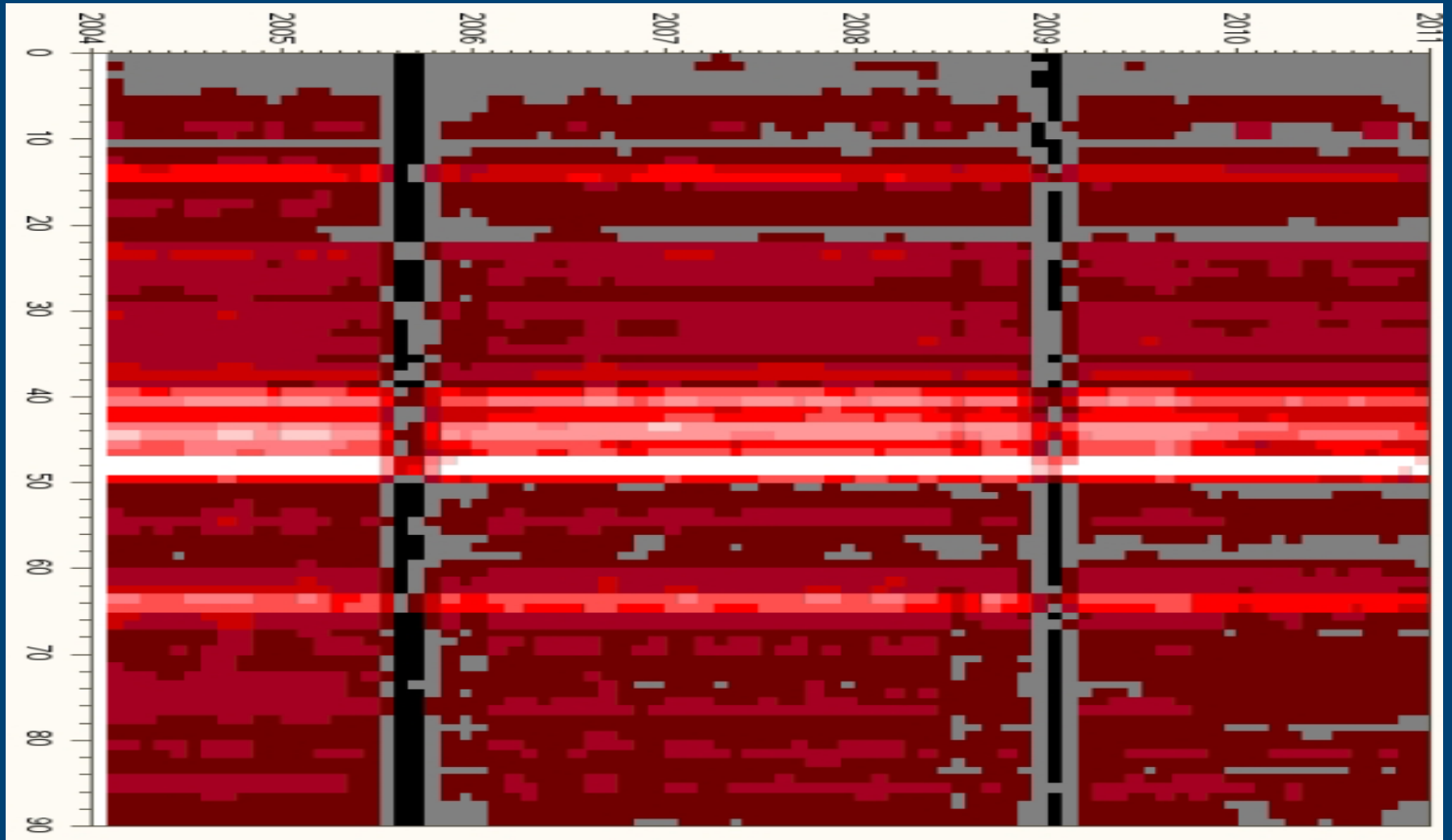
# Example: Econometrics



# Example: Econometrics



# Example: Geographic



# Binning on the Vertical Axis (Non-Temporal Axis)

```
data work.flux;  
    set hr_1040.flux_h_alpha_cc_flat;  
    wavelength = round(wavelength,0.1);  
run;  
  
proc sort data=work.flux;  
    by obs_date wavelength;  
run;  
  
proc univariate data=work.flux noprint;  
    var flux;  
    by obs_date wavelength;  
    output mean=flux out=work.flux;  
run;
```

# Binning on the Time Axis

```
proc sort data=work.flux;
  by wavelength period;
run;

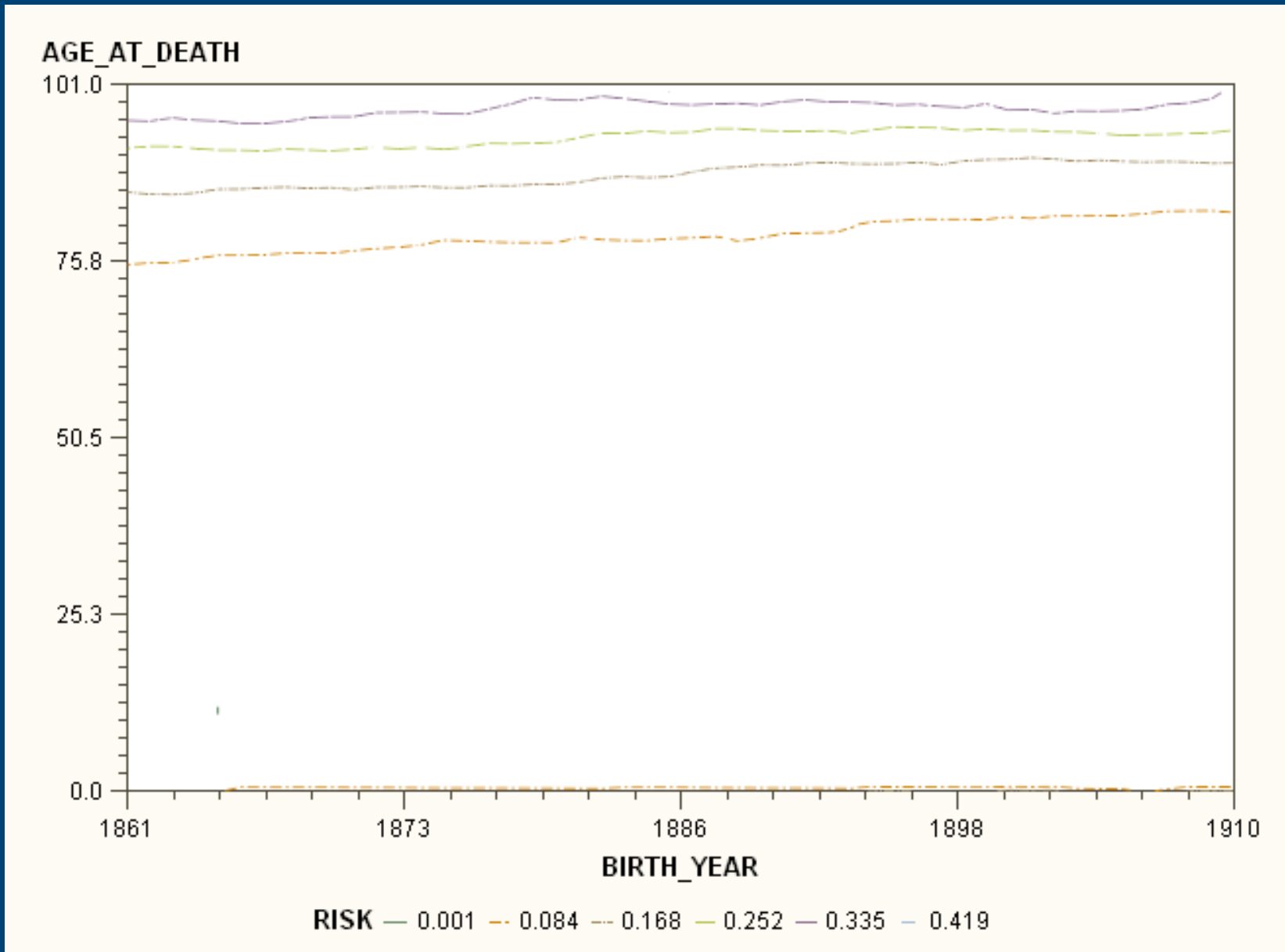
proc univariate data=work.flux noprint;
  var flux;
  by wavelength period;
  output mean=flux out=work.flux;
run;

data work.flux;
  set work.flux;
  obs_date = mdy(9,18,1994) + (2 * period) - 1;
  julian_date = obs_date + 2436935;
  jd_minus_24e5 = julian_date - 2400000;
run;
```

# Basic Contour Plot

```
goptions reset=all border;  
  
proc gcontour data=work.plot_data;  
    plot age_at_death * birth_year = risk;  
    run;  
quit;
```

# Basic Contour Plot



# Title, Legend, Axes etc

```
goptions reset=all border;

title1 'MORTALITY RATE BY AGE AND YEAR OF BIRTH';
legend1 label=none value=(justify=left 'TEXT 1'
                                'TEXT 2' 'TEXT 3' 'TEXT 4')

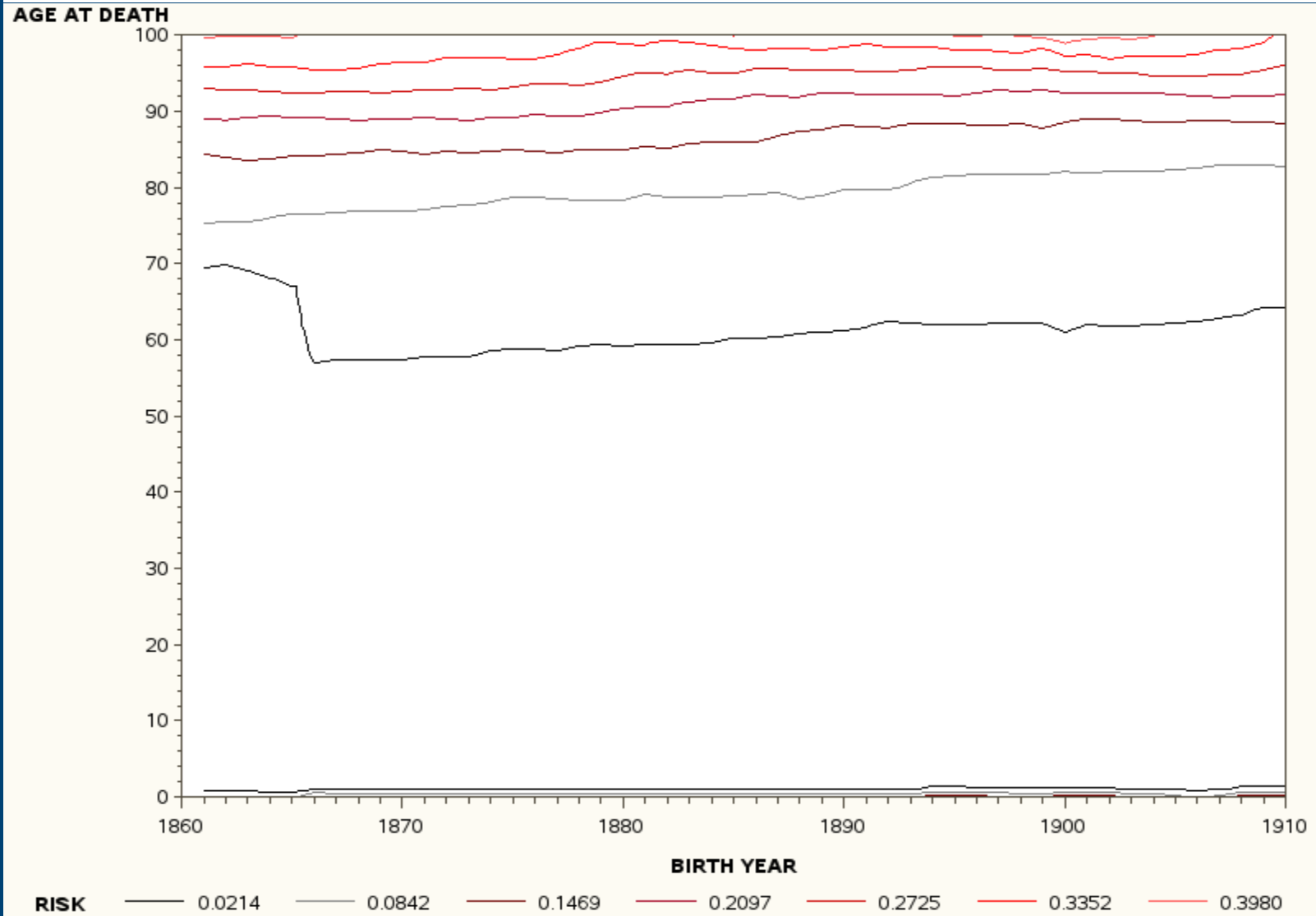
footnote j=r height=1.0 font=swiss 'David Corliss 5/17/2011';

goptions colors=(black grey cx700000 cxa50021 cxcc0000 cxff0000
                cxff5050 cxff7c80 cxff9999 cxffc000 cxffffff);
axis1 order=(1860 to 1910 by 10) label=('BIRTH YEAR');
axis2 order=(0 to 100 by 10) label=('AGE AT DEATH');

proc gcontour data=work.plot_data;
  plot age_at_death * birth_year = risk;
      / haxis = axis1
        vaxis = axis2
        ;
run;
quit;
```

# Title, Legend, Axes etc

## MORTALITY RATE BY AGE AND YEAR OF BIRTH



# Specifying Contour Levels

```
goptions reset=all border;

title1 'MORTALITY RATE BY AGE AND YEAR OF BIRTH';
legend1 label=none value=(justify=left 'TEXT 1'
                               'TEXT 2' 'TEXT 3' 'TEXT 4')

footnote j=r height=1.0 font=swiss 'David Corliss 5/17/2011';

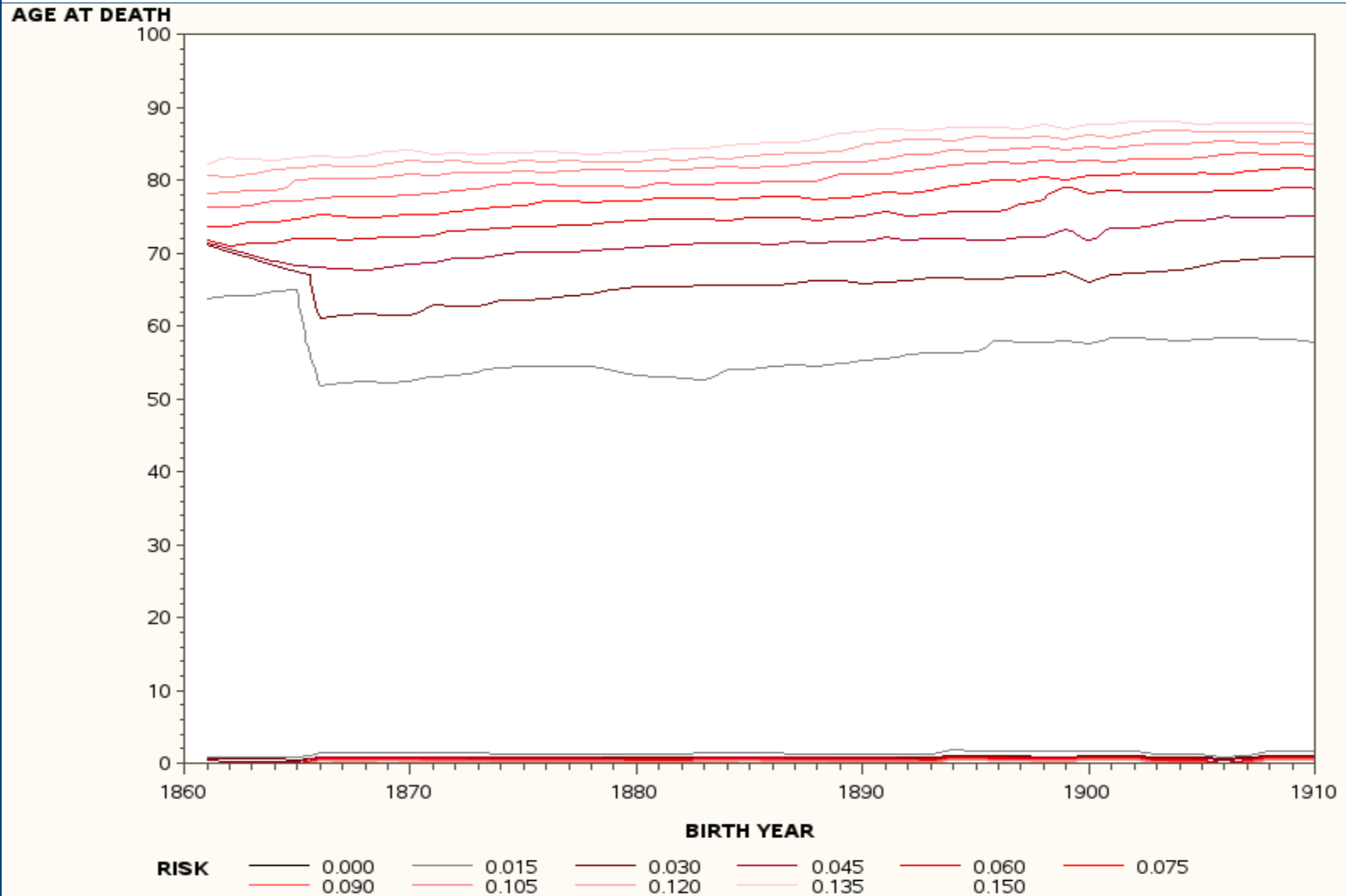
goptions device = png
        /* device = png - active-x ignores the levels statement */
        colors=(black grey cx700000 cxa50021 cxcc0000 cxff0000
                cxff5050 cxff7c80 cxff9999 cxffc000 cxffffff);
axis1 order=(1860 to 1910 by 10) label=('BIRTH YEAR');
axis2 order=(0 to 100 by 10) label=('AGE AT DEATH');

proc gcontour data=work.plot_data;
  plot age_at_death * birth_year = risk;
  / levels = 0.00 to 0.15 by 0.015
    haxis = axis1
    vaxis = axis2
  ;

run;
quit;
```

# Specifying Contour Levels

## MORTALITY RATE BY AGE AND YEAR OF BIRTH



# PATTERN and JOIN: Solid Colors

```
title1 'MORTALITY RATE BY AGE AND YEAR OF BIRTH';
legend1 label=none value=(justify=left 'TEXT 1'
                                'TEXT 2' 'TEXT 3' 'TEXT 4')

footnote j=r height=1.0 font=swiss 'David Corliss 5/17/2011';

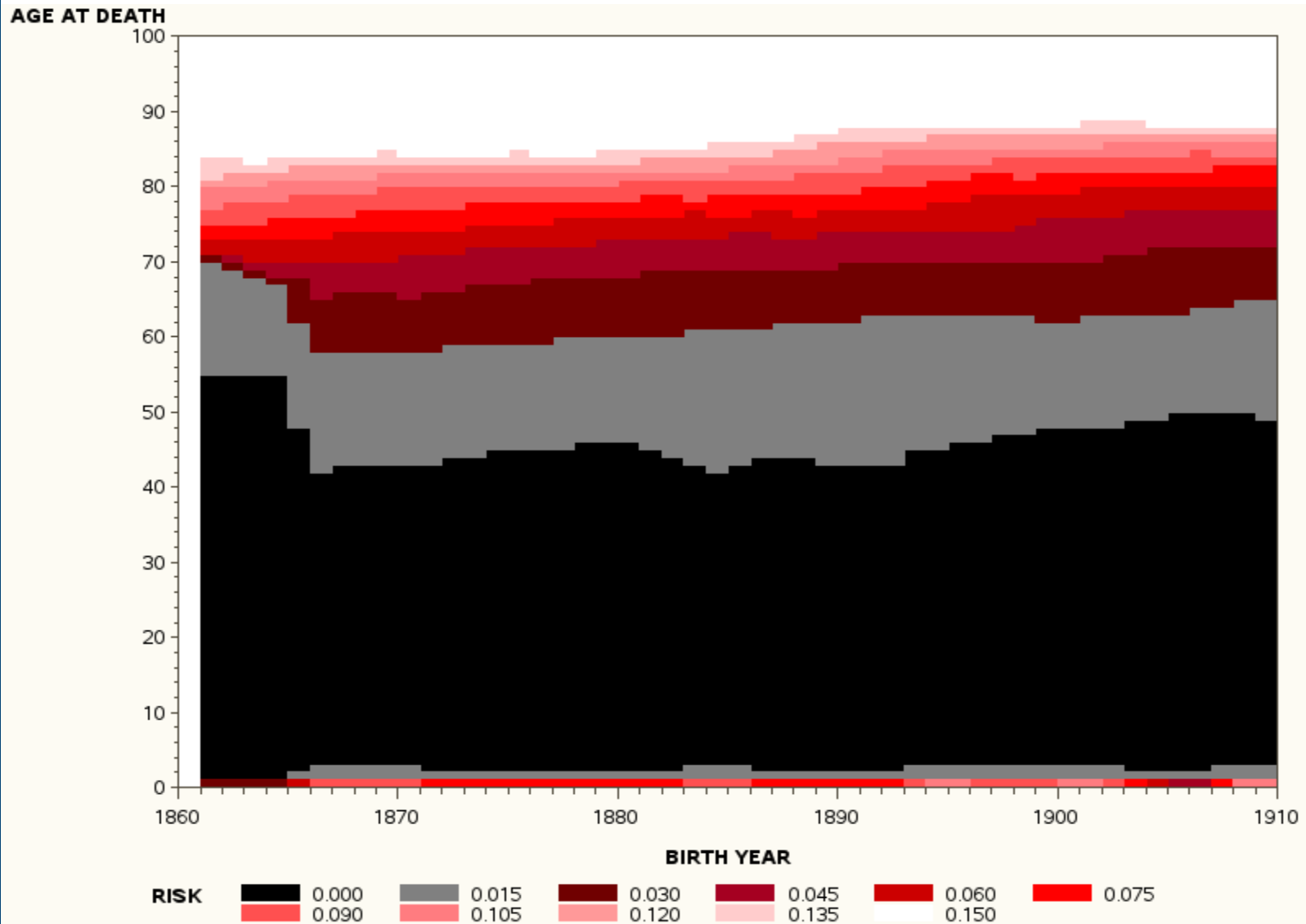
goptions device = png
          /* device = png - active-x ignores the levels statement */
          colors=(black grey cx700000 cxa50021 cxcc0000 cxff0000
                  cxff5050 cxff7c80 cxff9999 cxffcccc cxffffff);
axis1 order=(1860 to 1910 by 10) label=('BIRTH YEAR');
axis2 order=(0 to 100 by 10) label=('AGE AT DEATH');

proc gcontour data=work.plot_data;
  plot age_at_death * birth_year = risk;
    / pattern
      join
      levels = 0.00 to 0.15 by 0.015
      haxis = axis1
      vaxis = axis2
      ;

  run;
quit;
```

# PATTERN and JOIN: Solid Colors

## MORTALITY RATE BY AGE AND YEAR OF BIRTH



# ODS Output: the Final Plot

```
title1 'MORTALITY RATE BY AGE AND YEAR OF BIRTH';
legend1 label=none value=(justify=left 'TEXT 1'
                             'TEXT 2' 'TEXT 3' 'TEXT 4')
footnote j=r height=1.0 font=swiss 'David Corliss 5/17/2011';

ods listing close;
ods html path='/home/sas/permanent/DJC/SAS' file='test.html';

goptions device = png /* active-x ignores the levels statement */
          colors=(black grey cx700000 cxa50021 cxcc0000 cxff0000
                  cxff5050 cxff7c80 cxff9999 cxffc000 cxffffff);
axis1 order=(1860 to 1910 by 10) label=('BIRTH YEAR');
axis2 order=(0 to 100 by 10) label=('AGE AT DEATH');

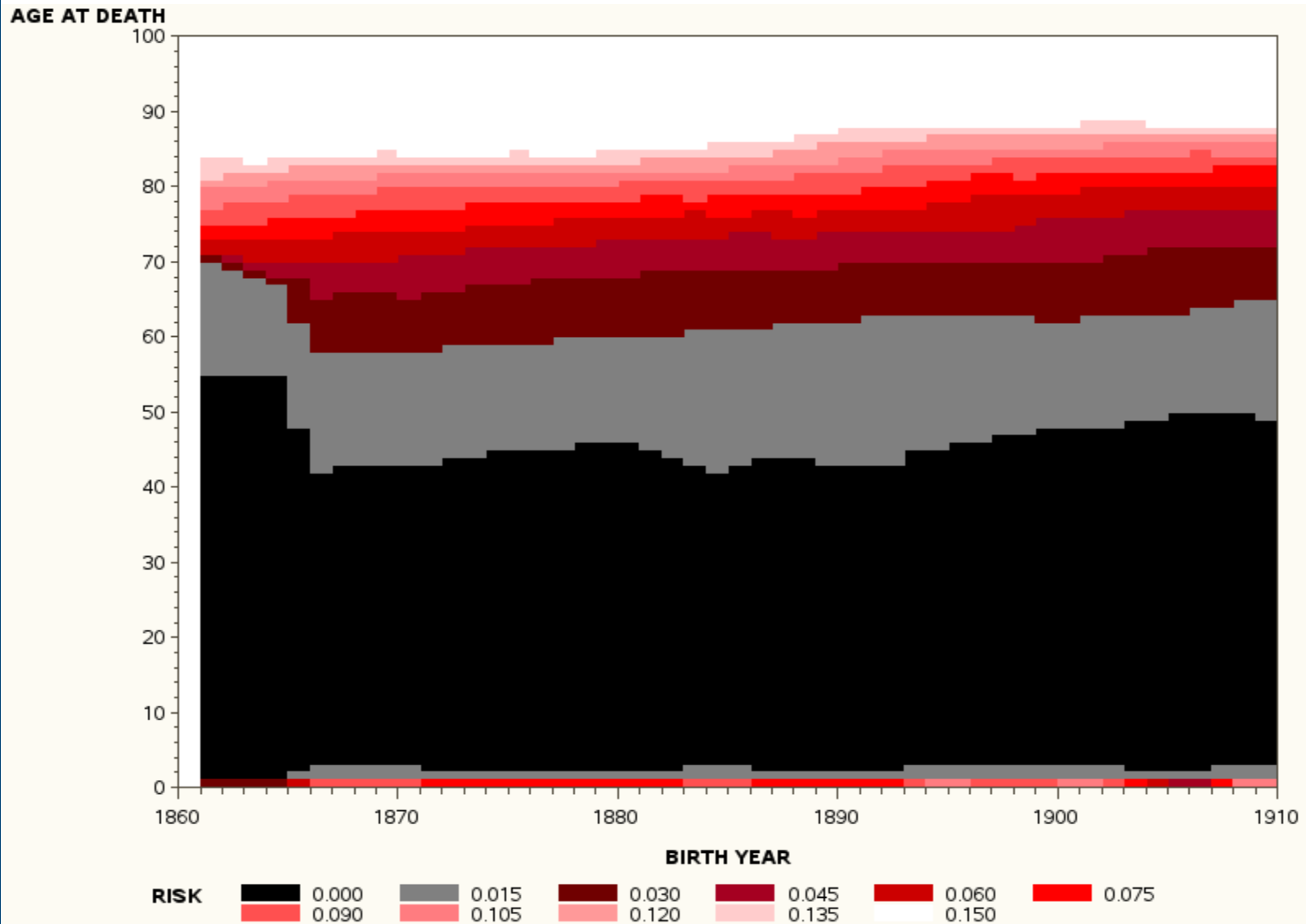
proc gcontour data=work.plot_data;
  plot age_at_death * birth_year = risk;
  / pattern join
    levels = 0.00 to 0.15 by 0.015
    haxis = axis1 vaxis = axis2;

run;
quit;

ods html close;
ods listing;
```

# ODS Output: the Final Plot

## MORTALITY RATE BY AGE AND YEAR OF BIRTH



# Summary

**PROC GCONTOUR with PATTERN and JOIN options can be used to create time contour plots**

**The color of individual cells is formatted to indicate the value of a third dimension in these two-dimensional plots**

**Time can be plotted vertically or horizontally**

**Binning by time interval is often needed before the plot can be created**

**Uses include pharmaceutical, econometrics, demographics and scientific applications**

# References

Kaufer, A., Stahl, O., Wolf, B., Gang, Th., Gummersbach, C.A., Kovacs, J., Mandel, H., Szeifert, Th., 1996, A&A, 305, 877

Richardson, N., 2006, Master's Thesis, University of Toledo

The SAS Institute, Cary, N.C. [www.support.sas.com](http://www.support.sas.com)

# Questions

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