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# DigiSun: a software dedicated to scientific measurement of sunspot drawings

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# DigiSun : the software

## Login page

DigiSun

Welcome to DigiSun!

Drawings directory:

Database name:

Operator name:

Applications:

## Daily scan

Scanner settings

Scanner found: Not working on Linux system

dpi:

drawings directory:

Drawing information

Operator:

Observer:

Date:

Time (UT):

Type:

Quality:

## Bulk analysis

Mode Help

Drawing selection per date:

start date:

end date:

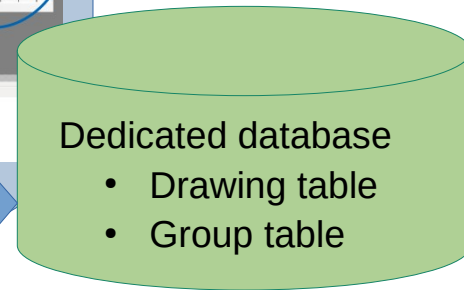
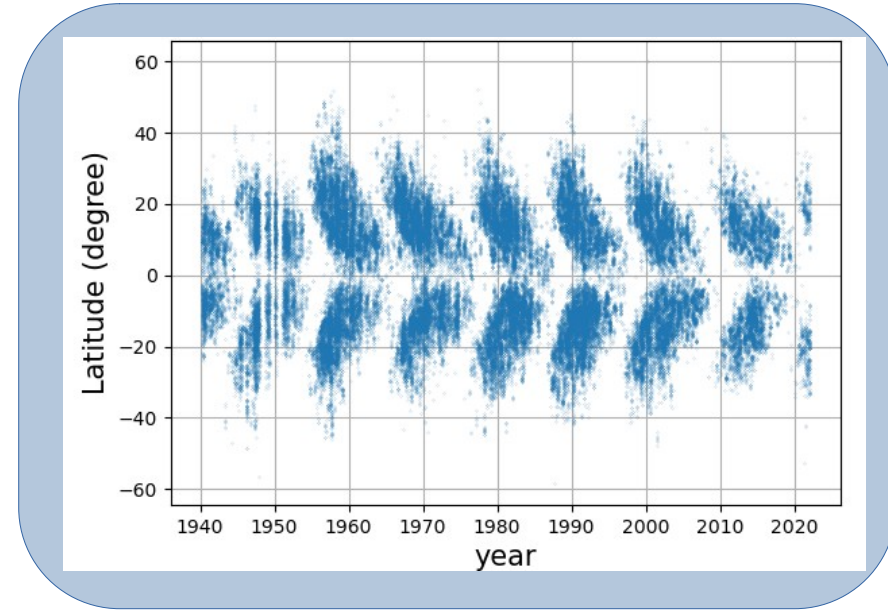
Drawing selection per year:

date	# total	calibrated	analysed	area
63 2002	250	100%	84%	82%
64 2003	341	100%	93%	91%
65 2004	285	99%	99%	27%
66 2005	324	99%	100%	97%
67 2006	398	100%	100%	16%
68 2007	388	100%	100%	100%
69 2008	295	100%	100%	100%
70 2009	286	100%	100%	71%
71 2010	277	100%	97%	97%
72 2011	272	100%	100%	1%
73 2012	257	100%	99%	2%
74 2013	240	100%	100%	0%
75 2014	263	100%	100%	11%
76 2015	284	96%	87%	5%
77 2016	277	100%	60%	9%
78 2017	279	100%	82%	56%
79 2018	122	99%	94%	92%
80 2019	61	100%	100%	6%
81 2020	1	100%	100%	0%

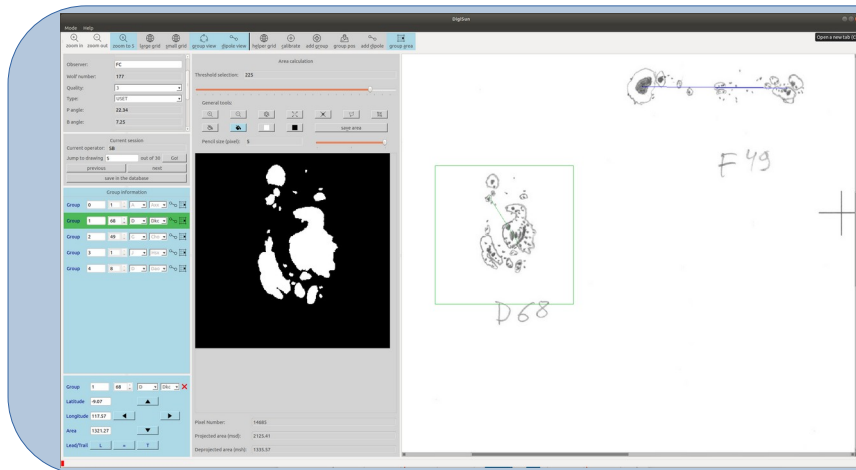
date	# total	calibrated	analysed	area
1 Jan 2014	14	100%	100%	100%
2 Feb 2014	17	100%	100%	82%
3 Mar 2014	29	100%	100%	0%
4 Apr 2014	30	100%	100%	3%
5 May 2014	23	100%	100%	0%
6 Jun 2014	25	100%	100%	0%
7 Jul 2014	20	100%	100%	5%
8 Aug 2014	24	100%	100%	0%
9 Sep 2014	27	100%	100%	0%
10 Oct 2014	22	100%	100%	0%
11 Nov 2014	21	100%	100%	0%
12 Dec 2014	11	100%	100%	0%

# DigiSun : drawing analysis

The screenshot shows the DigiSun software interface. At the top, there is a **Modes toolbar** with icons for zoom in, zoom out, zoom toggle, large grid, small grid, group view, dipole view, helper grid, calibrate, add group, add dipole, and surface. Below the toolbar is the **Drawing viewer**, which displays a solar drawing of the sun with a grid and various annotations. To the left of the drawing viewer are several information widgets: **Drawing Information widget** (containing fields for Date, Time, Observer, Wolf number, Quality, Type, P angle, B angle, L angle, Carrington rotation, Last Operator, and Last Update), **Current session widget** (containing Current operator, Jump to drawing, and buttons for previous, next, and save), **Group Information widget** (listing Group 0 through Group 7 with their respective parameters), and **Group Information toolbox** (containing Latitude, Longitude, Surface, and Lead/Trail fields). At the bottom left is the **Status bar** with the text "Click on a dipole positions to add it".



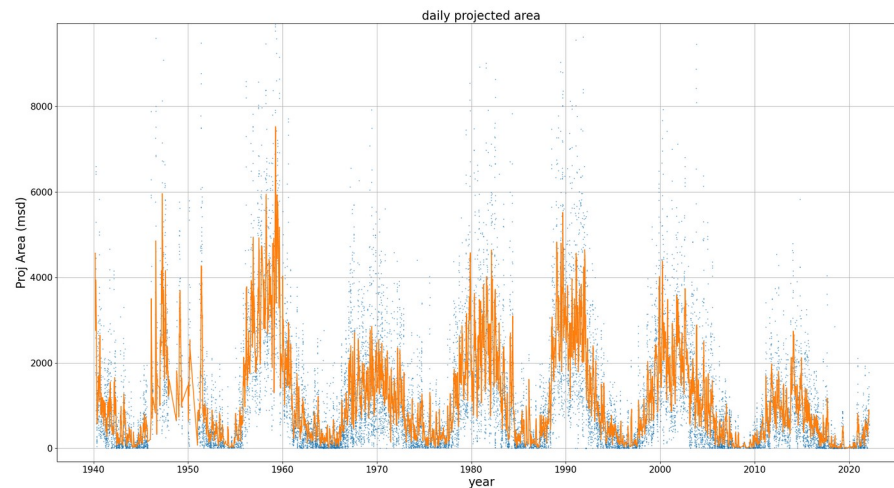
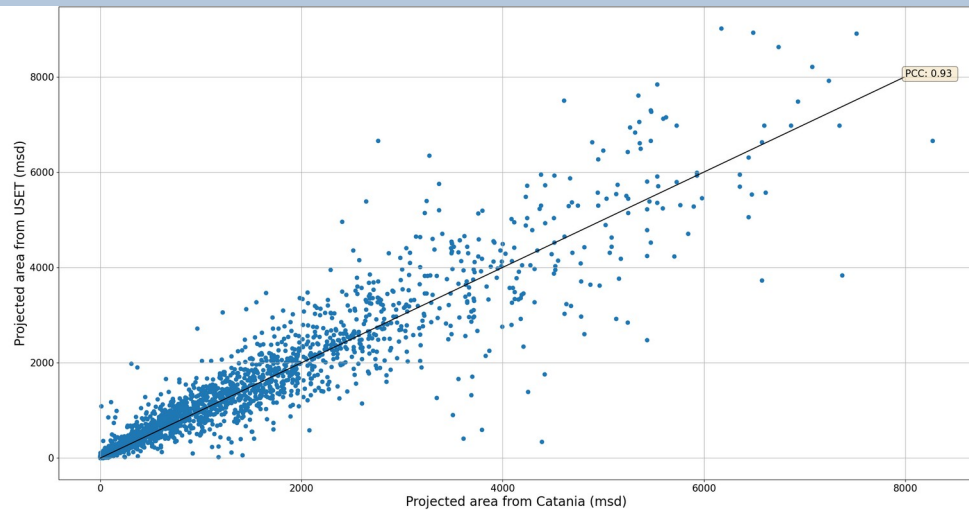
# DigiSun : the area module



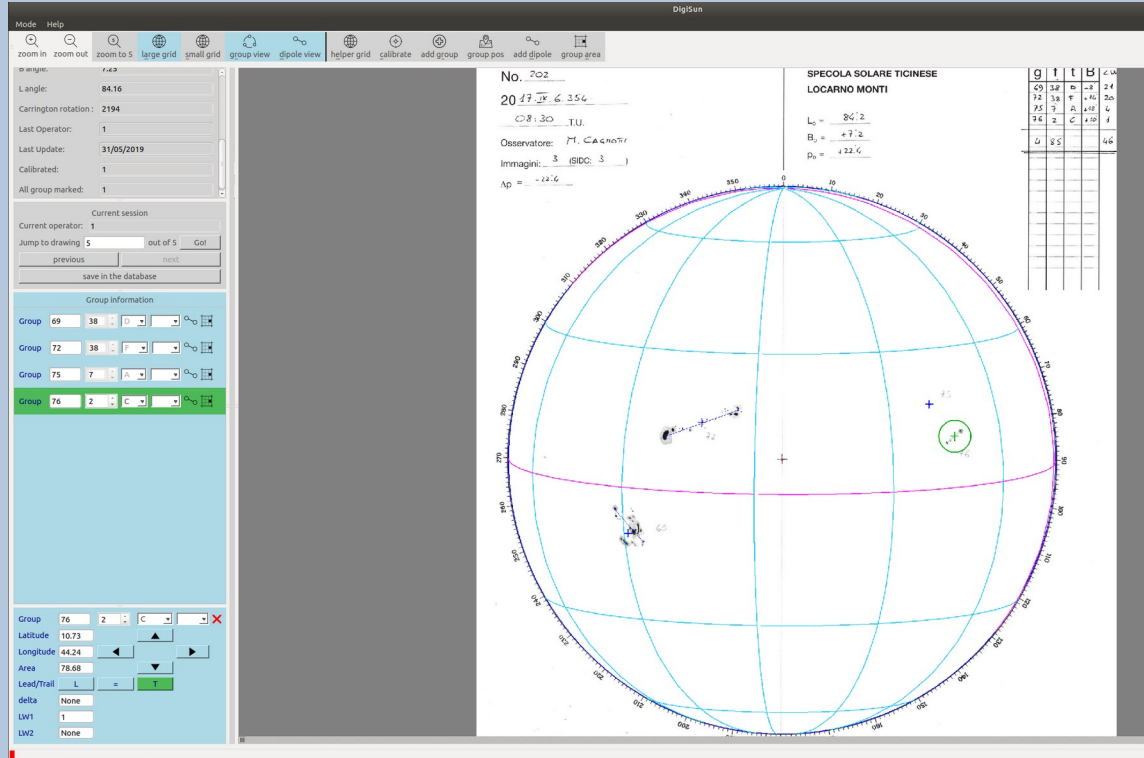
$$A_{raw} = \sum_i p_i$$

$$A_{proj} = \frac{A_{raw} 10^6}{\pi R^2}$$

$$A_{deproj} = \sum_i \left( \frac{p_i}{\cos(\rho_i)} \right) \frac{10^6}{2\pi R^2}$$



# DigiSun : Distribution to other observatories



- Easy to share
  - Modularity
  - Portability
  - Flexibility
- Successful collaboration with the Specola Observatory in Locarno
  - Different drawing orientation
  - Additional fields (group number, weighted sunspot number)
- Better standardization of data extracted from solar collection
  - Inter-operable data
  - Fill the gap due to bad weather
  - Extend data in the past