

Impact detection on Jupiter through amateurs processing of their own videos

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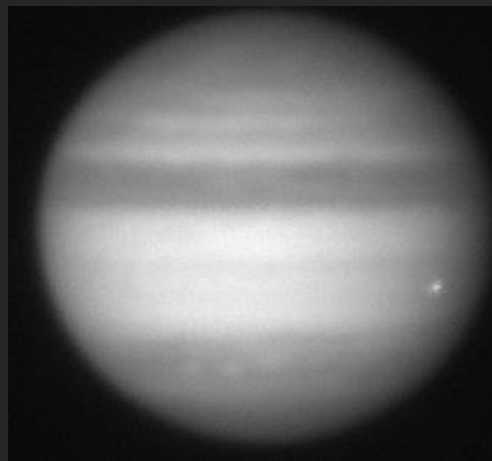
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- DeTeCt is a project with associated software which objectives are:
 - Helping amateur **astronomers to discover flashes** on their videos, resulting from the **impact of small bodies** in Jupiter's and Saturn's atmospheres
 - **Estimating the impact frequencies** on those planets, through the collection and processing of the results (positive, negative) obtained with the software
- Software performs **differential photometry** on the videos, and generates **detection images** to detect flashes



MAX

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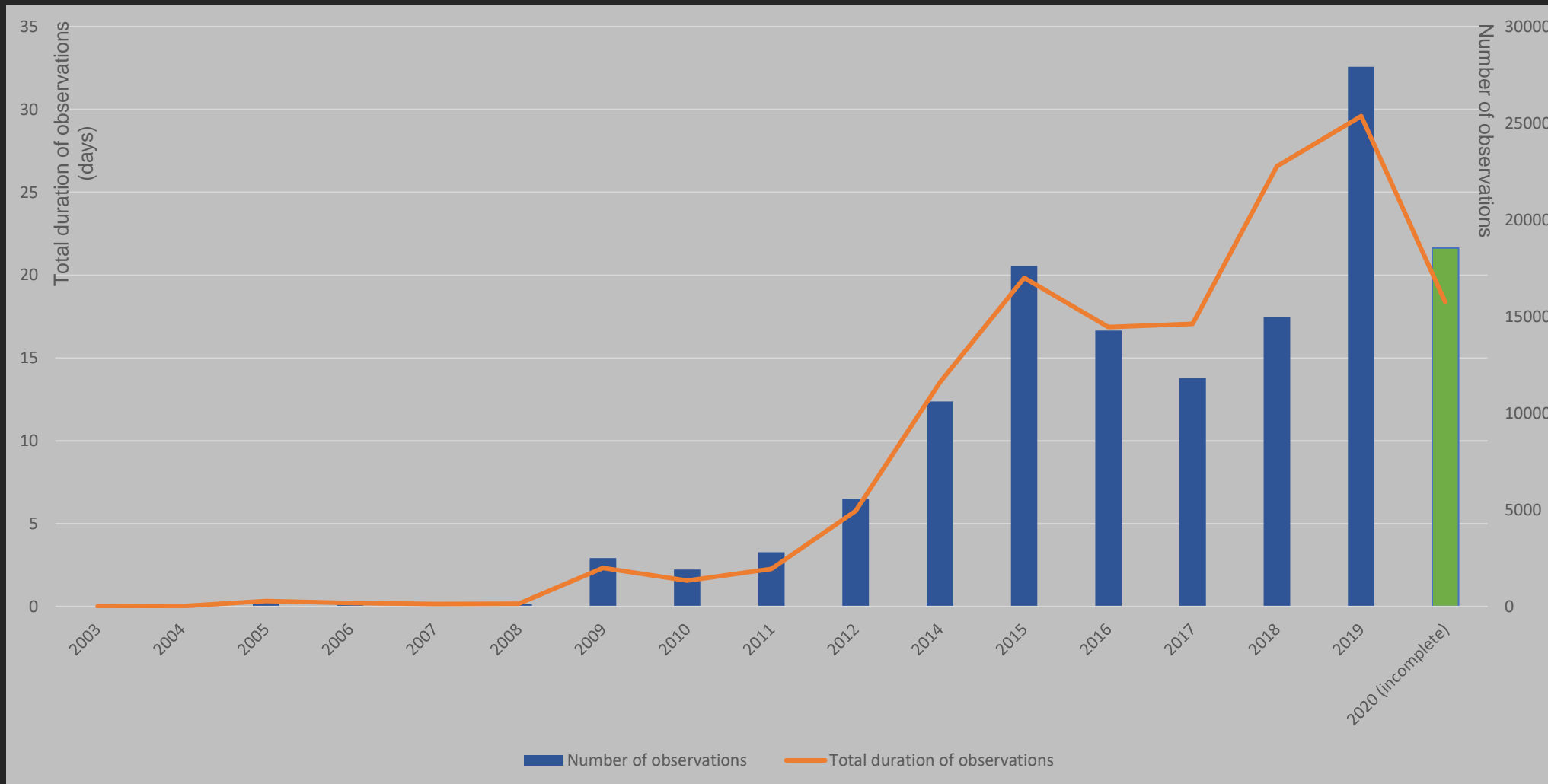
AVERAGE

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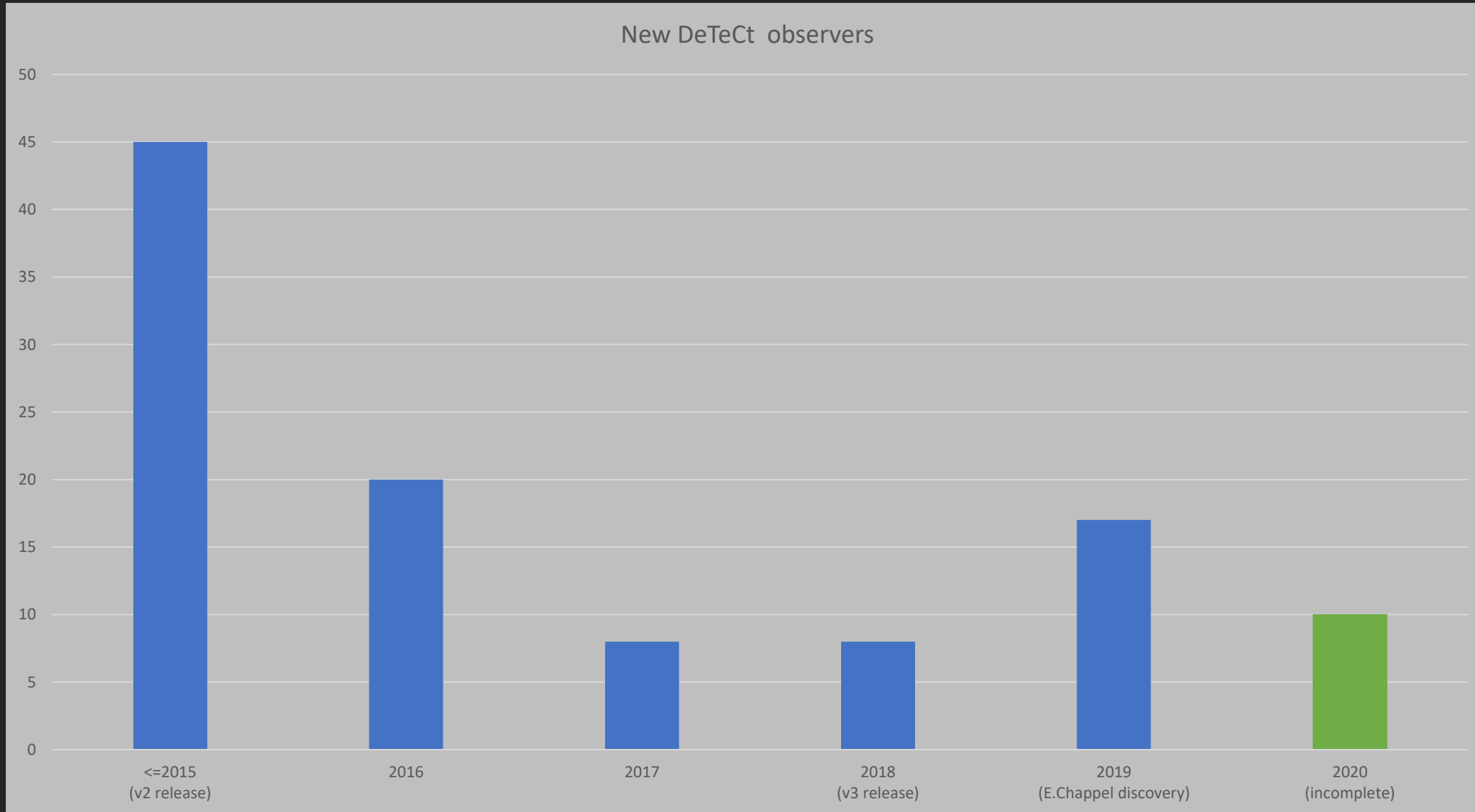


DETECTION IMAGE

- For the **current 2020 apparition**, **boost** in project **participation** following Ethan Chappel's flash discovery though DeTeCt on 2019.08.07
 - 2020 observations to catch up with record 2019 participation



➤ New observers (+11%)

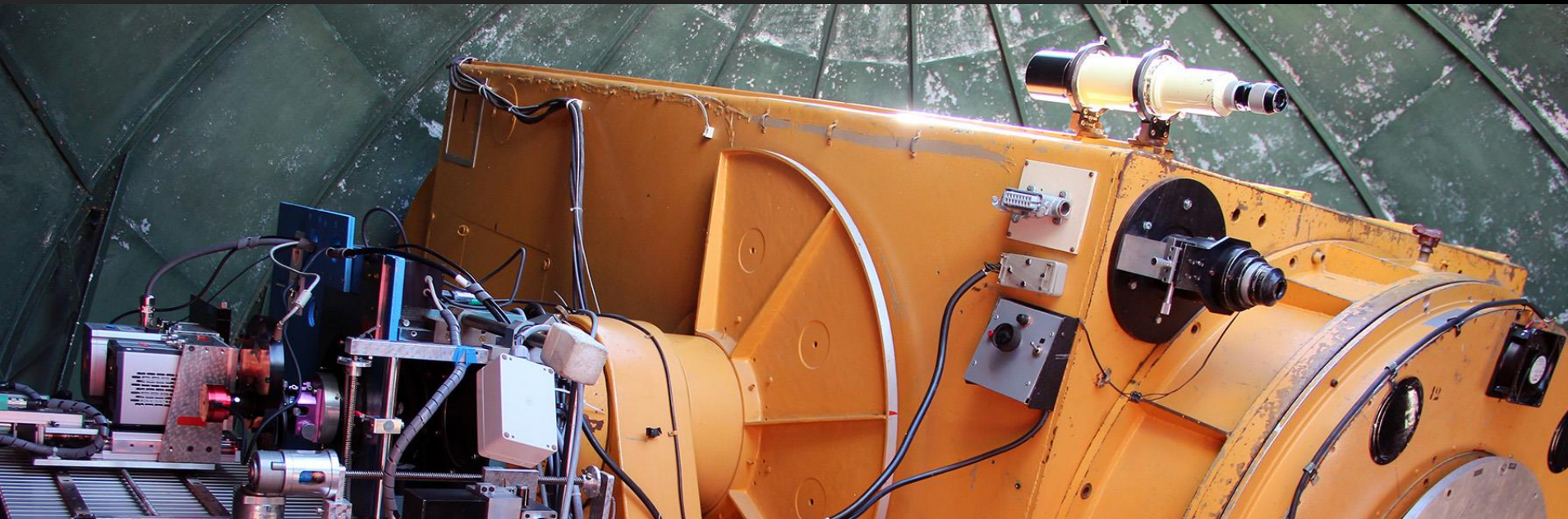
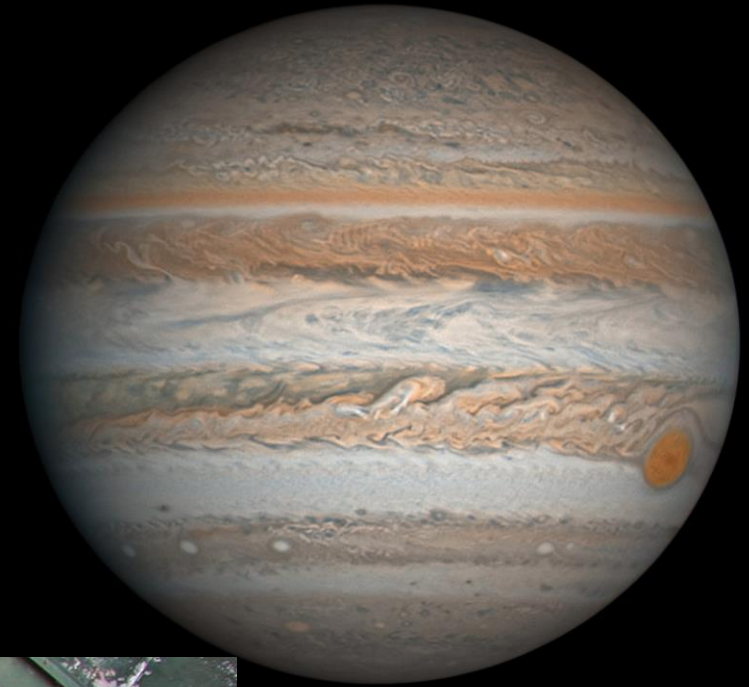


➤ Ongoing campaign since 2012 with 1m professional telescope at Pic du Midi

❑ Benefit from excellent seeing, 1m diameter size telescope

❑ In the long run expectation of positive detections

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Impact flashes detection with DeTeCt software project /
Projet de détection de flash d'impacts avec le logiciel DeTeCt
by/par [Marc Delcroix](#)

NEW v3.3.0! [Software download / téléchargement du logiciel](#) for participating to the project / pour participer au projet

NEW! [DeTeCt quick user guide](#)

DeTeCt impact frequency estimation (as of 2020.09.07)

Jupiter: ~14.1 impacts/year (106 observers ~144 000 videos ~156 days of videos)
Saturn: <34 impacts/year (40 observers ~>10 000 videos ~22 days of videos)

Jupiter

estimation of 14,1 impacts per year (absolute number)
total excludes 9,457 days of simultaneous observations

Observer	Duration	Number of videos	Date range
Total : 106 observers	155.909 days	143692 videos	2003/04/18 - 2020/09/06
Zac Pujic (Australia)	22.511 days	9081	2005/02/22 - 2020/09/04
Michel Jacquesson (France)	19.773 days	10158	2014/03/12 - 2020/08/26
Benito Loyola (USA)	18.038 days	18481	2018/02/17 - 2020/09/05
Paul Rolet (France)	15.781 days	13158	2012/09/07 - 2020/09/05
Manos Kardasis (Greece)	9.506 days	8161	2004/02/29 - 2019/11/27
Clyde Foster (South Africa)	7.108 days	8867	2015/01/30 - 2020/08/11
Thomas Ashcraft (USA)	5.046 days	6114	2013/10/09 - 2020/09/03
Bernd Gaehrken (Germany)	4.432 days	6025	2016/03/06 - 2020/08/10
Sauveur Pedranghelu (France)	4.223 days	5202	2017/05/26 - 2020/08/08
Alan Coffelt (USA)	3.799 days	2801	2013/10/04 - 2020/09/03
Marc Delcroix (France)	3.765 days	2847	2006/04/13 - 2020/08/18
Jose Luis Pereira (Brazil)	3.553 days	4765	2019/01/30 - 2020/09/04
Ethan Chappel (USA)	2.644 days	2037	2013/09/01 - 2020/05/01
Agapios Elia (Cyprus)	2.493 days	3037	2013/11/09 - 2020/08/19
Christophe Pellier (France)	2.374 days	906	2012/02/20 - 2019/07/28
Xavier Dupont (France)	2.062 days	1867	2012/08/16 - 2015/04/25
Hampton University Sayanagi Group (USA)	2.028 days	1543	2018/03/23 - 2019/03/29
Grant Blair (USA)	1.988 day	1874	2013/08/20 - 2016/04/21
Jean-Luc Dauvergne (France)	1.822 day	1607	2016/05/04 - 2020/08/17
Michel Miniou (France)	1.695 day	1533	2003/04/18 - 2020/07/20
Trevor Barry (Australia)	1.615 day	2425	2009/07/06 - 2012/12/30
Pascal Bayle (France)	1.494 day	1702	2012/11/30 - 2017/05/21
David Domine (France)	1.450 day	907	2016/02/25 - 2017/04/10
Torsten Mellenthin (Germany)	1.218 day	1416	2016/01/28 - 2017/06/24
Lammertus de Vries (Spain)	1.171 day	635	2009/08/03 - 2015/05/08
Pic du Midi (Colas/Delcroix/Dauvergne/Sylla) (France)	1.164 day	1861	2010/09/29 - 2019/08/16
Jocelyn Serot (France)	1.154 day	880	2014/01/10 - 2019/06/02
Stephane Gonzales (France)	1.131 day	1243	2013/12/20 - 2018/06/03
Ioannis Bouhras (Greece)	1.022 day	1480	2015/12/24 - 2020/08/29
Martin Lewis (UK)	1.020 day	1509	2015/03/22 - 2019/09/05
Matic Smrekar (Slovenia)	0.956 day	1648	2009/07/29 - 2019/06/10
Arnaud Claisse (France)	0.941 day	842	2014/01/19 - 2016/05/03
Oleg Zaharciuc (Moldova)	0.822 day	1120	2016/05/19 - 2020/08/30

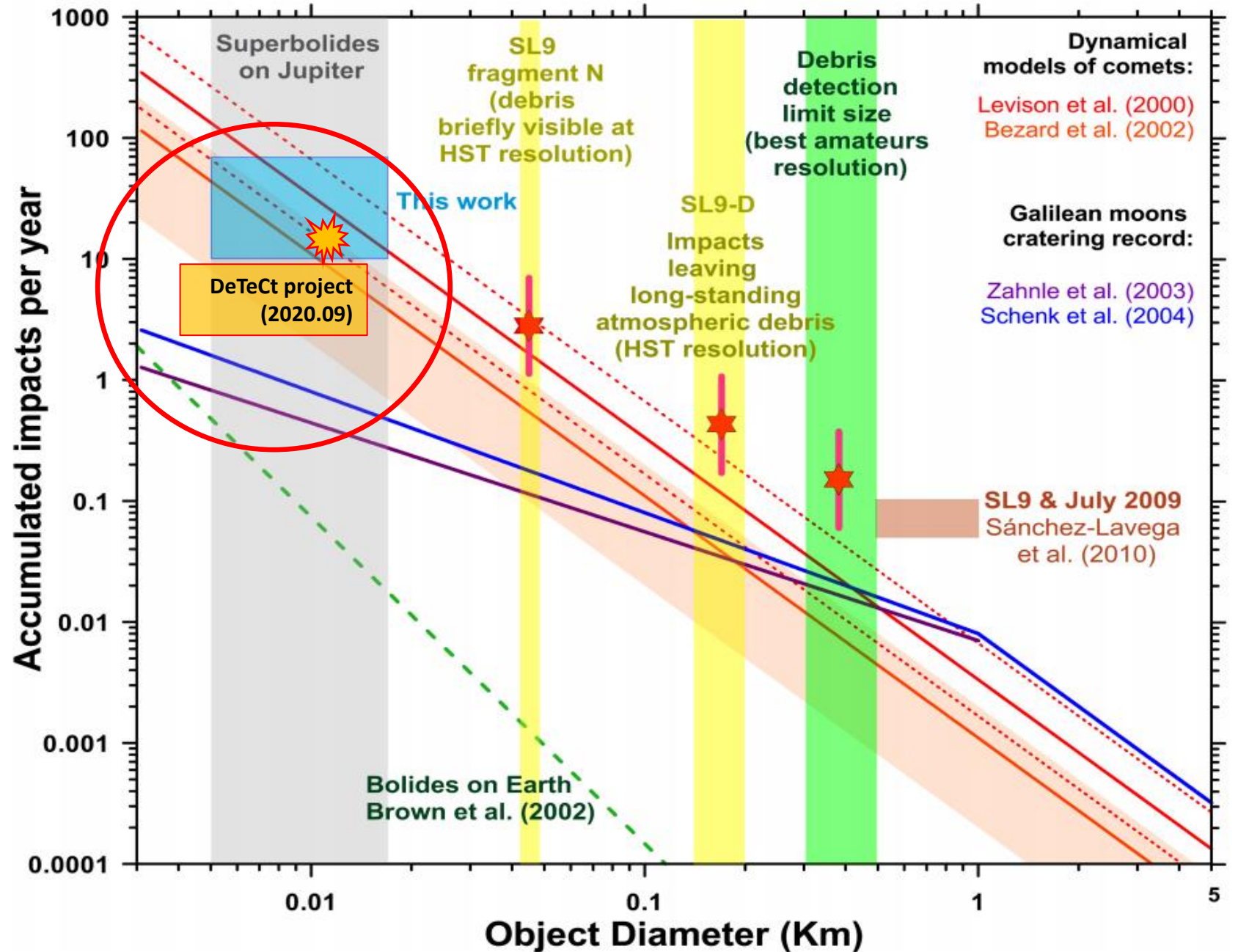
Saturn

estimation of less than 33,6 impacts per year (absolute number)
total excludes 0,173 days of simultaneous observations

Observer	Duration	Number of videos	Date range
Total : 40 observers	21.724 days	10411 videos	2003/11/07 - 2020/09/04
Zac Pujic (Australia)	5.252 days	2131	2005/02/04 - 2018/04/21
Marc Delcroix (France)	2.983 days	1186	2007/01/20 - 2020/08/18
Sauveur Pedranghelu (France)	2.649 days	819	2019/06/03 - 2020/08/06
Paul Rolet (France)	2.242 days	623	2015/05/12 - 2020/08/18
Ethan Chappel (USA)	1.600 day	927	2013/07/30 - 2020/05/01
Manos Kardasis (Greece)	1.069 day	713	2008/03/10 - 2018/10/27
Oleg Zaharciuc (Moldova)	0.649 day	325	2016/05/22 - 2020/08/30
Michel Miniou (France)	0.636 day	474	2003/11/07 - 2019/12/04
Benito Loyola (USA)	0.497 day	567	2018/07/11 - 2019/07/30
Pic du Midi (Colas/Delcroix/Dauvergne/Sylla) (France)	0.454 day	434	2012/08/06 - 2019/08/15
Grant Blair (USA)	0.445 day	255	2014/03/14 - 2016/04/24
Philippe Chatelain (France)	0.421 day	43	2017/05/21 - 2019/08/02
Wellington Pereira Fonseca (Brazil)	0.377 day	192	2020/06/10 - 2020/09/04
Ioannis Bouhras (Greece)	0.331 day	274	2019/09/03 - 2020/07/19
Arnaud Claisse (France)	0.260 day	62	2015/05/21 - 2016/05/04
Societe Astronomique de Touraine (France)	0.223 day	92	2014/03/14 - 2016/07/16
Stephane Gonzales (France)	0.195 day	89	2015/05/23 - 2017/06/05
David Domine (France)	0.171 day	35	2016/04/23 - 2017/04/08
Alan Coffelt (USA)	0.167 day	62	2015/05/03 - 2020/08/09
Martin Lewis (UK)	0.167 day	169	2015/05/21 - 2019/07/28
Jose Luis Pereira (Brazil)	0.162 day	160	2019/05/22 - 2020/08/28
Isaac Lozano Rey (Spain)	0.156 day	126	2020/06/24 - 2020/09/04
Emmanuel Thiers (France)	0.095 day	34	2016/05/06 - 2016/06/18
Matic Smrekar (Slovenia)	0.092 day	88	2011/06/27 - 2019/05/08
Christian Pinter (Austria)	0.092 day	9	2019/06/29 - 2020/08/25
Denis Huber (France)	0.080 day	63	2019/07/20 - 2020/08/27
Charles Galdies (Malta)	0.078 day	82	2014/06/08 - 2015/07/17
Philipp Salzgeber (Austria)	0.072 day	55	2017/06/10 - 2020/08/08
David Olivos (Mexico)	0.067 day	51	2020/05/25 - 2020/07/16
Charles Triana (Colombia)	0.064 day	96	2017/08/10 - 2019/08/19
Blake Estes (USA)	0.055 day	79	2016/05/08 - 2016/05/13
Lee Keith (USA)	0.035 day	20	2020/07/25 - 2020/08/19
Michel Jacquesson (France)	0.031 day	4	2019/09/03 - 2019/09/04

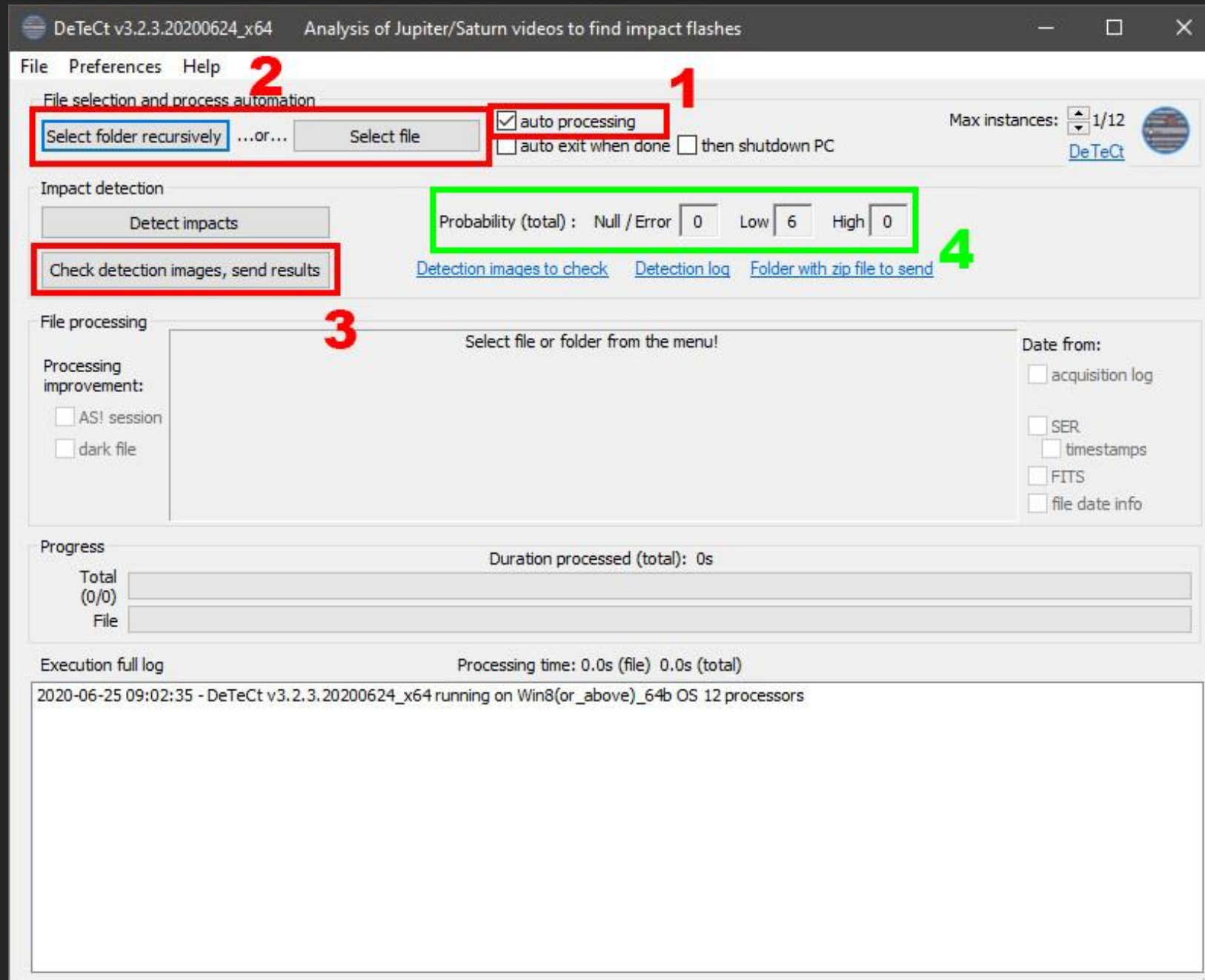
~14 impacts/y fitting
lower end of
previous estimations
(w/o 2019 flash)

(Hueso et al., A&A, 2018)



Many improvements in 2020
(v3.3.0):

- ✓ Fully redesigned GUI, simpler and more informative
- ✓ Multi instances mode increasing processing speed (ex: x6 on my 12 cores/SSD setup)
- ✓ 16bits FITS, image files and SER support
- ✓ Comprehensive quick user guide



Warm thanks to some of the 100+ participants to the project!



Join us!



Take aways

✓ Detection project participation **growing fast**

✓ **Frequency** estimation **coherent** with other works

✓ Software with **regular improvements/updates**

□ Keep your version of **DeTect uptodate (v3.3.0 just released)**

<https://github.com/DeTeCt-PSWS/DeTeCt-MFC/releases/latest>

□ **Participate** to the project, be the 7th impact flash discoverer!

Check/send packaged detection **zip** file (delcroix.marc@free.fr)