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От Сильченко О.К.

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The recurrent impact of the Sagittarius dwarf galaxy on the star formation history of the Milky Way disc

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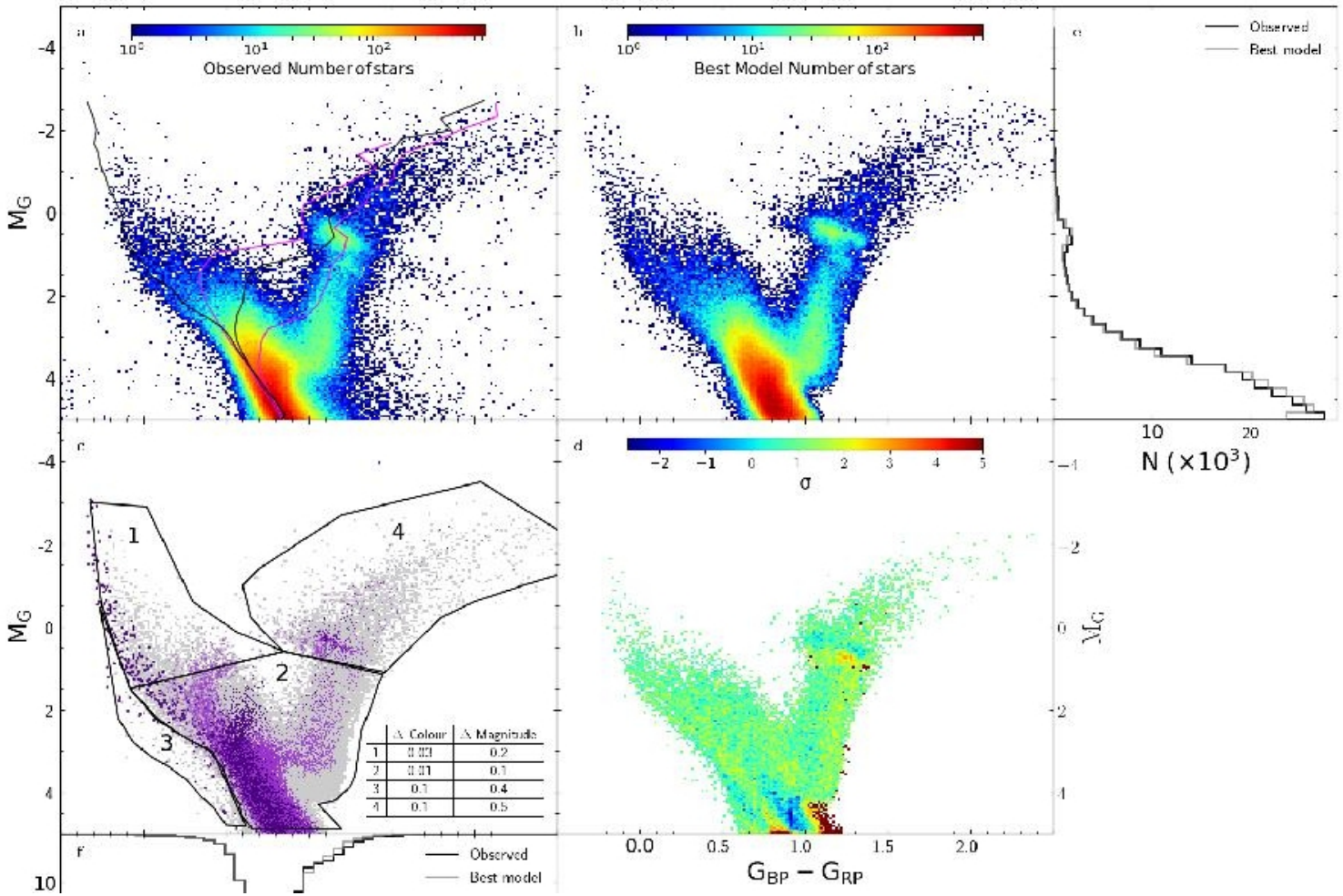
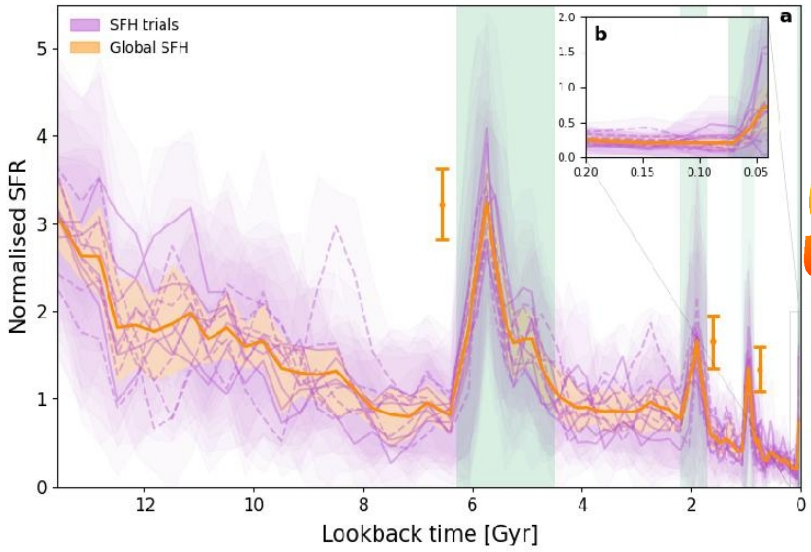
Satellites orbiting disc galaxies can induce phase space features such as spirality, vertical heating and phase-mixing in their discs[1–4]. Such features have also been observed in our own Galaxy[5–7], but the complexity of the Milky Way disc has only recently been fully mapped thanks to Gaia DR2 data[8,9]. This complex behaviour is ascribed to repeated perturbations induced by the Sagittarius dwarf galaxy (Sgr[10]) along its orbit[11–14], pointing to this satellite as the main dynamical architect of the Milky Way disc. Here, we model Gaia DR2 observed colour-magnitude diagrams to obtain the first detailed star formation history of the $\sim$ 2-kpc bubble around the Sun. It reveals three conspicuous and narrow episodes of enhanced star formation that we can precisely date as having occurred 5.7, 1.9 and 1 Gyr ago. Interestingly, the timing of these episodes coincides with proposed Sgr pericentre passages according to i) orbit simulations[13,15], ii) phase space features in the Galactic disc[11,12,14,16], and iii) Sgr stellar content[17,18]. These findings most likely suggest that Sgr has

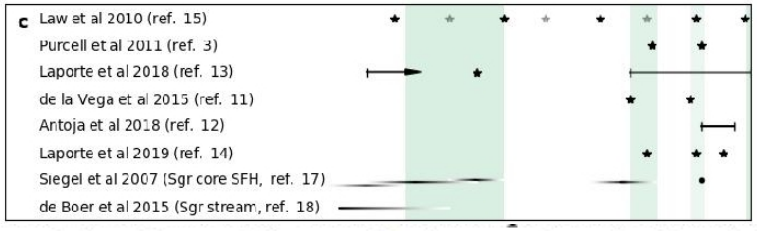
Gaia/DR2: Фотометрия и параллаксы 24 млн звезд до 2 кпк от Солнца



История звездообразования и сближения с Sgr



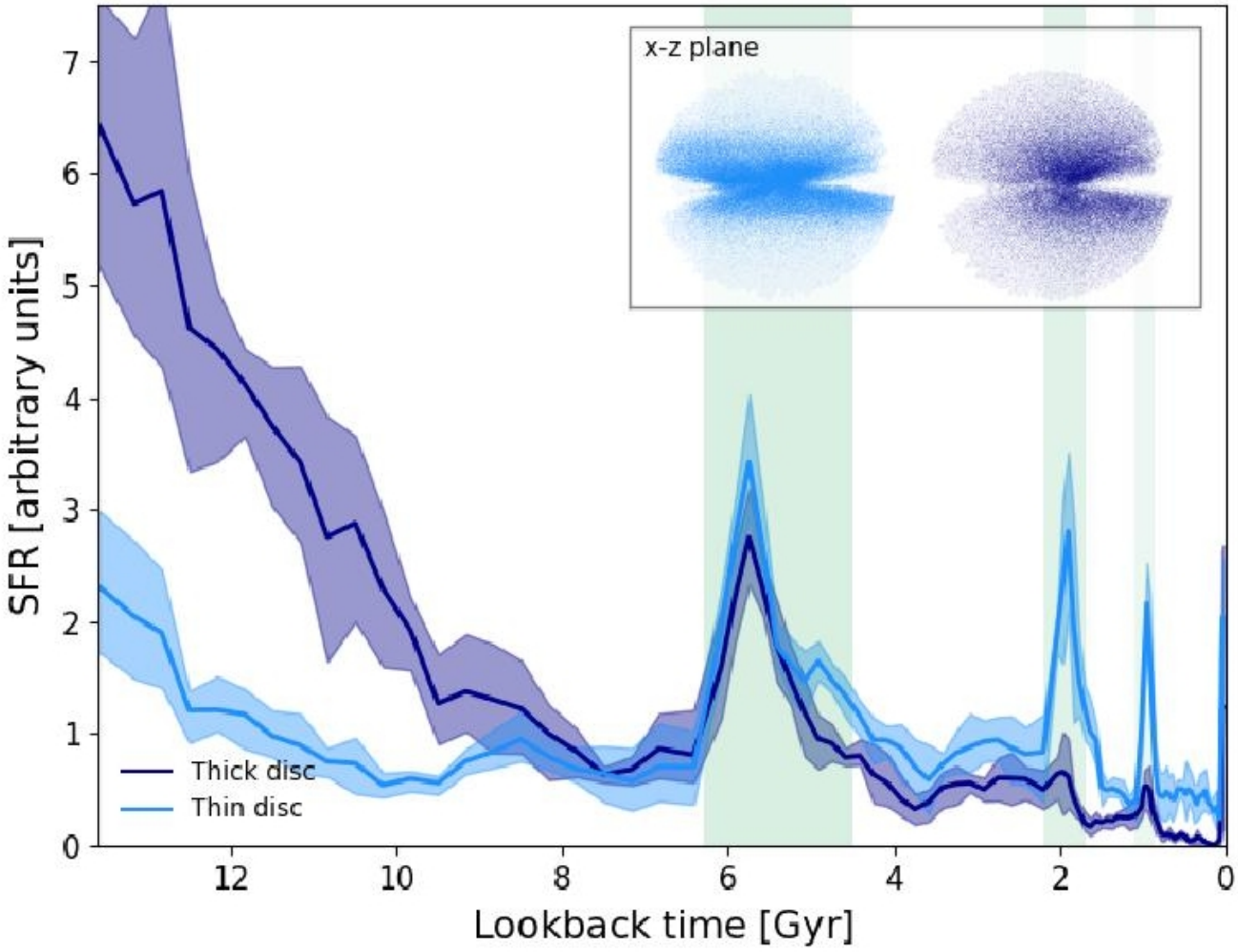
SFH: экспонента + 3 вспышки



А это восстановленная орбита и звездное население Sgr

around the Sun. Figure 2 shows the derived SFH. We find that the Milky Way has been forming stars continuously along its entire history, with a decreasing intensity compatible with other massive spirals[27]. On top of this overall behaviour, it displays three strikingly well-defined star formation enhancements that ocurred $\sim$ 5.7, 1.9, and 1.0 Gyr ago, with a measured duration of 0.8, 0.2 and 0.1 Gyr, respectively (twice the σ of a gaussian distribution fitted to each peak in the solution), and decreasing strength. There is also a hint of a fourth possible star formation burst spanning the last 70 Myr. Extensive testing using

А вот во вспышку звездообразования в толстом диске верится плохо…



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Making It Rain: How Giving Me Telescope Time Can Reduce Drought

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Abstract

In this paper we assess the correlation between recent observing runs (2018 and 2019) and inclement weather, and demonstrate that these observing runs have seen much more rainfall than would otherwise be expected, an increase of over 200%. We further look at a number of observatory sites in areas that are facing or will face drought, and suggest that a strong environmental benefit would follow from telescope allocation committees providing us an inordinate amount of telescope time at facilities located around the globe.

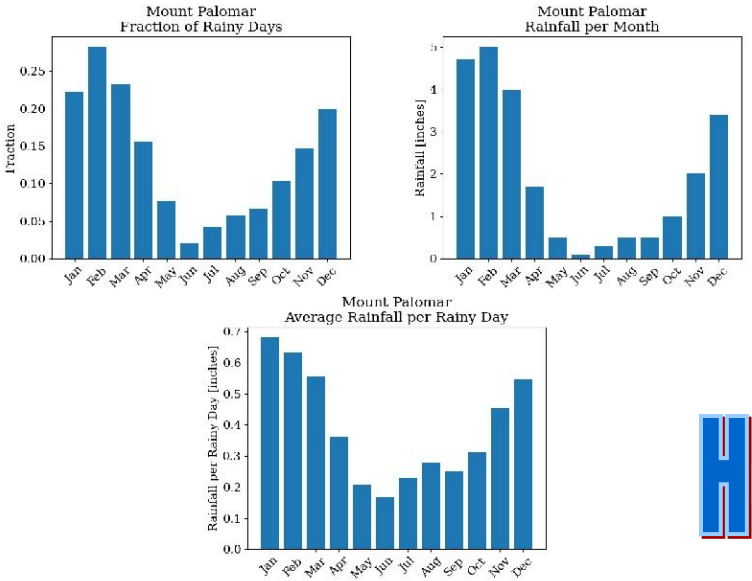
Статистически значимое увеличение осадков в ночи наблюдений на Паломаре

Table 1: *Mount Palomar Climate Data*

Month	Rainy Days	Inches of Rain
Jan	6.9	4.7
Feb	7.9	5.0
Mar	7.2	4.0
Apr	4.7	1.7
May	2.4	0.5
Jun	0.6	0.1
Jul	1.3	0.3
Aug	1.8	0.5
Sep	2.0	0.5
Oct	3.2	1.0
Nov	4.4	2.0
Dec	6.2	3.4
Total	48.6	23.7

Table 2: *Weather on Observing Runs*

Observing Run	Rainy Nights
Feb 21-22, 2019	2
Mar 20-21, 2019	2
Apr 17, 2019	0
May 15-16, 2019	2
Jun 11-13, 2019	3
Jun 22, 2019	1
Jul 22, 2019	1
Nov 8-9, 2019	2
Mar 9-10, 2020	2



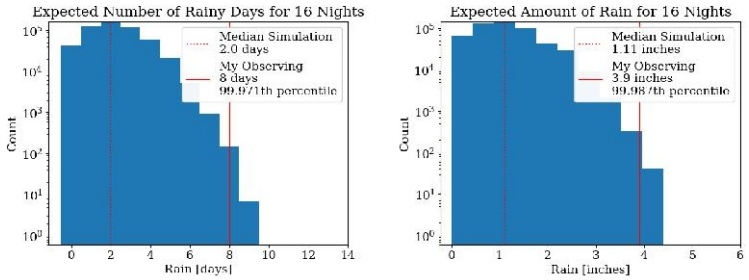


Figure 2: *We simulated 525,600 sets of comparable observing runs. On the left we show the distribution of how many rainy nights to expect, with the median being one fourth of what we observed. On the right we show the expected rainfall is much less than our observed rainfall. In both cases, our observed rainfall exceeds the 99th percentile.*

Независимо от сезона!

То была чистая наука, а вот это уже юмор: 7ми обсерваториям предлагается бороться с засухой

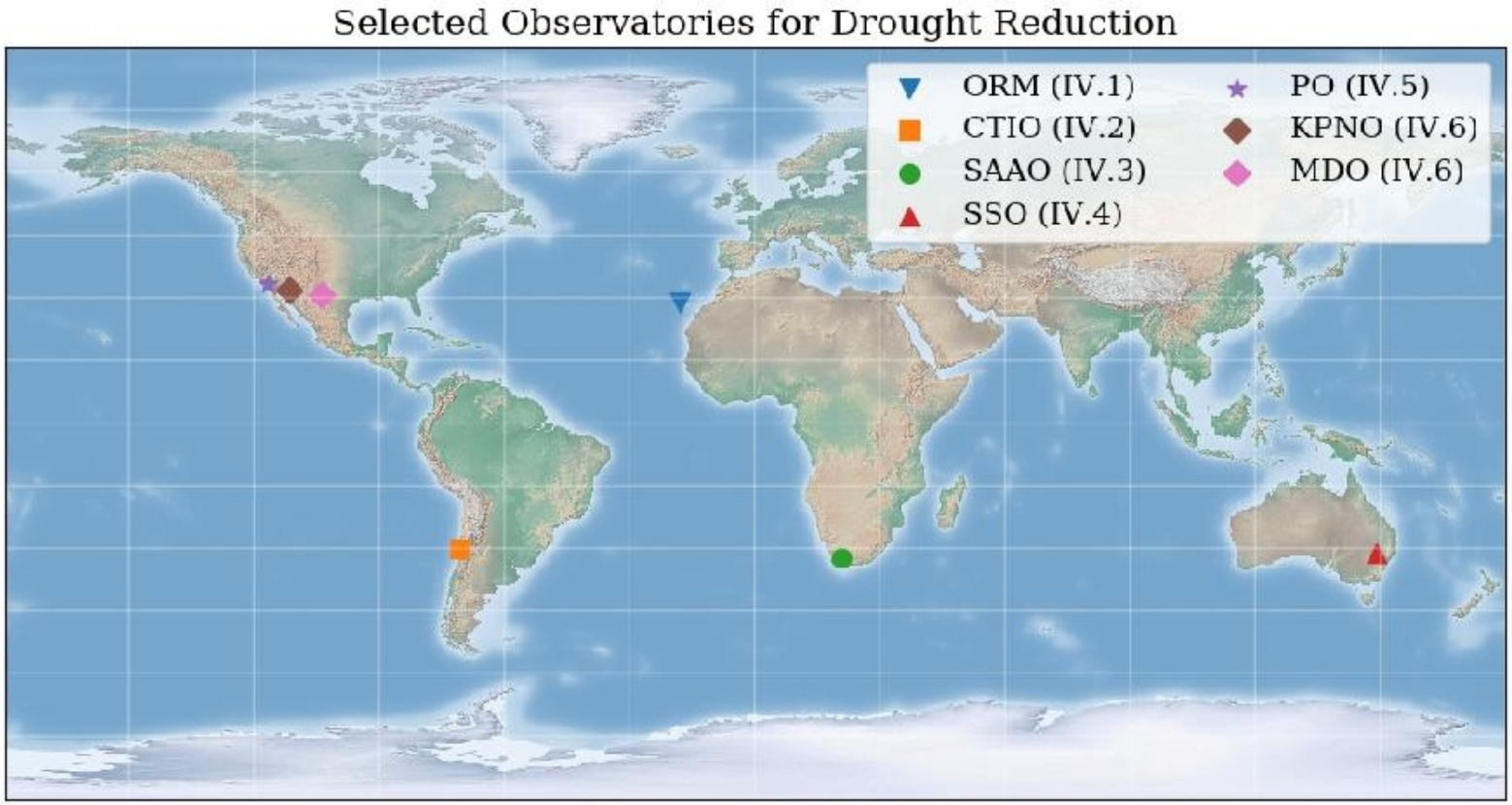


Figure 3: *All observatories that we have selected as ideal for getting telescope time to counter drought, spanning 5 continents. We label each site with the observatory abbreviation and the subsection that they are discussed in.*