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ADDENDUM: THE DWARF IRREGULAR GALAXY SEXTANS A. II. RECENT STAR FORMATION HISTORY [ASTRON. J. **114**, 2527 (1997)][1]

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SPATIAL VARIATION OF STAR FORMATION

It is well known that different regions of dwarf galaxies can have very different color-magnitude diagrams (CMDs). The implication is that each region has its own star formation history (SFH). An effort to understand the spatial variation of the SFH will not only reveal how these galaxies have evolved, but will illuminate the star formation process itself.

In Paper I (Dohm-Palmer et al. 1997a), we describe *Hubble Space Telescope* Wide Field Planetary Camera 2 photometric data of the resolved stars in the nearby ($D = 1.4$ Mpc) dwarf irregular galaxy Sextans A (DDO 75, A1008−04). The CMDs produced from this data set are very accurate and align well with stellar evolution model predictions for a low-metallicity system. Especially important is the photometric separation of the blue He-burning (HeB) stars, the bluest part of the so-called blue-loop phase, from the main sequence.

Paper II (Dohm-Palmer et al. 1997b) outlines a method for calculating the star formation rate (SFR) based on the blue HeB stars over the past 600 Myr. We have combined the spatial density distribution of the blue HeB stars with the SFR calculations to create a time sequence of SFR maps that can be viewed as a movie, a frame of which is shown in Figure 1.

The SFR calculation for this movie used the Padua stellar evolution models for $Z = 0.001$ (Bertelli et al. 1994) and assumed a Salpeter initial mass function (see Paper II for details). The spatial density maps were created with a Gaussian convolution kernal with $\sigma = 84$ pc. The movie has also been convolved in time, with $\sigma = 30$ Myr. The SFR density ranges from 0 to 3700 $M_\odot$ Myr^{-1} kpc^{-2}, where one star per convolution beam is roughly 60 $M_\odot$ Myr^{-1} kpc^{-2}. Finally, each frame is 1 kpc on a side, at the distance of Sextans A.

The movie begins 700 Myr ago and goes through ∼10 Myr steps to 100 Myr ago. The oldest star formation appears as a diffuse region in the lower part of the image. As time progresses, we see a patch of star formation move in from the bottom left corner. This appears to propagate toward the center of the image, peaking at about 370 Myr. This event then fades away as the young association in the bottom right comes to prominence at 200 Myr. Paper II provides a full discussion of the SFH of Sextans A and the implications of this movie.

[1] Based on observations with the NASA/ESA *Hubble Space Telescope*, obtained at the Space Telescope Science Institute, which is operated by the Association of Universities for Research in Astronomy, Inc., under NASA contract NAS 5-26555.

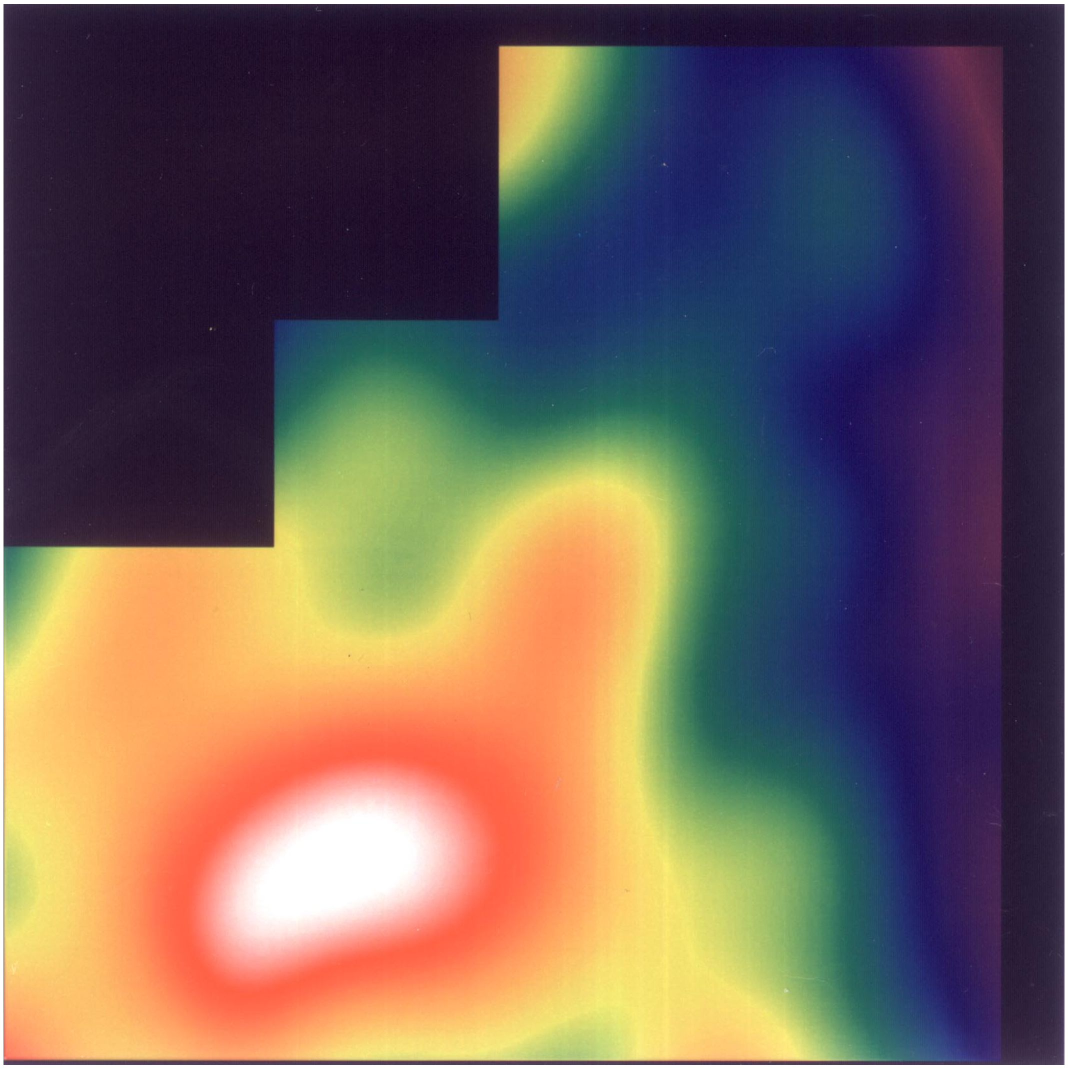

FIG. 1.—Frame from the time sequence of SFR maps

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Dohm-Palmer, R. C., et al. 1997a, AJ, 114, 2514 (Paper I)
———. 1997b, AJ, 114, 2527 (Paper II)