PS1 Image artifacts and anomalies

The OTA CCDs have known artifacts and anomalies. A lot of work has gone into characterizing these artifacts, and removing them if possible. Pixels affected by these artifacts or anomalies are tracked in the mask images with pixel flags.

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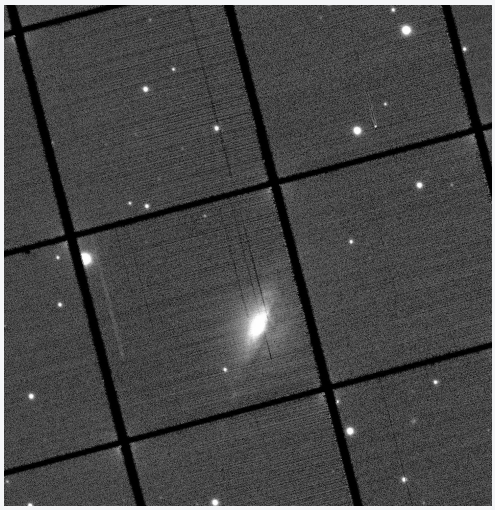
The starting point for the PS1 data archive is at Pan-STARRS1 data archive home page.

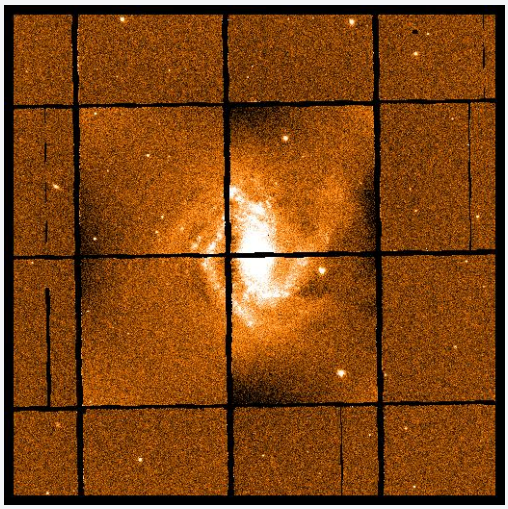
Row-by-row bias and continuity corrections

Certain CCDs suffer from an issue whereby the bias level varies between rows. A software fix based on a linear fit to the bias in each row (check if this is correct?) has been applied on CCDs prone to this effect, however

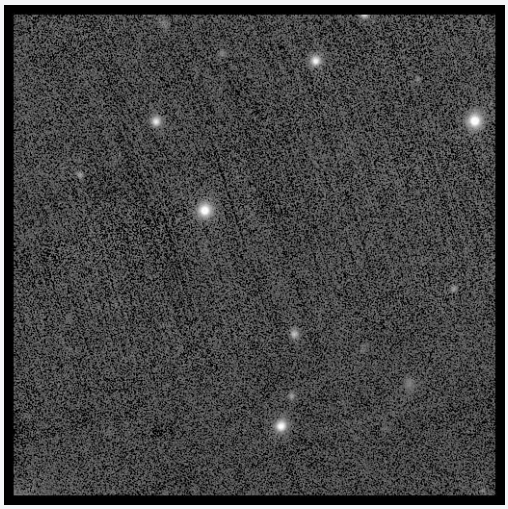
- sometimes CCDs are not identified as problematic so this issue is not corrected.
- in areas of strongly varying background (such as large galaxies) the fix itself can introduce extra problems as the bias level cannot be correctly estimated. This is exacerbated by the continuity correction, which tries to ensure that adjacent CCDs have a similar background level along their edges in common.



Example of row-by-row bias artifact on a g-band warp.



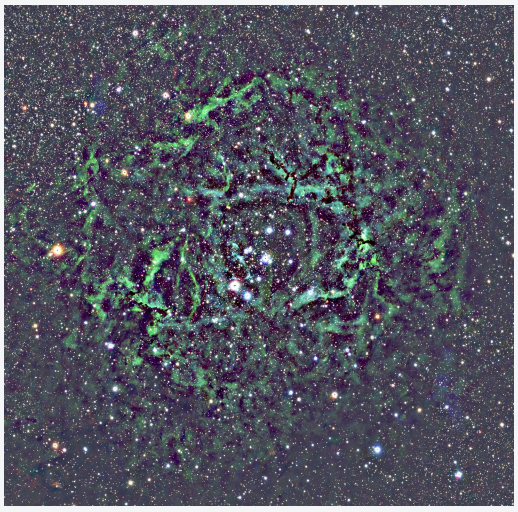
Example of problems on a warp around a bright galaxy caused by a combination of the row-by-row bias correction and continuity correction.



An example of uncorrected row-by-row bias effects imprinting through onto a stack.

Background oversubtraction

The sky subtraction routine is known to over-subtract around large galaxies or areas of nebulosity. There is currently no fix for this.

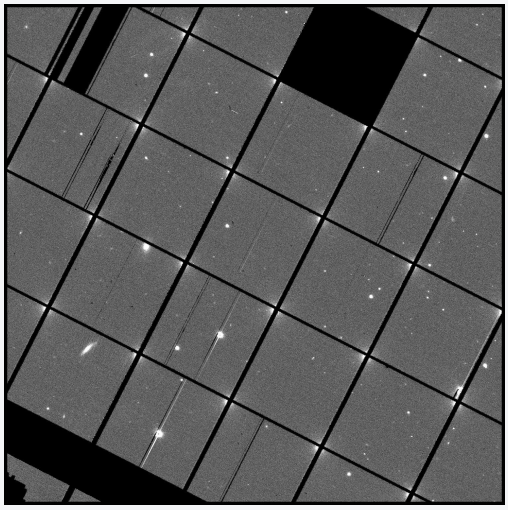


A dramatic example of the effect of over-subtraction of sky. This is a wide-field g+r+i image of the Rosette nebula. Much of the H-alpha emission (green) has been removed.

Burntool artifacts

Amplifier glow

Amplifier glow can sometimes be seen at the corners of the CCDs. These areas are usually masked, but in some cases the mask is either too small or not present.



An example of unmasked amplifier glow on a g-band Medium Deep warp.

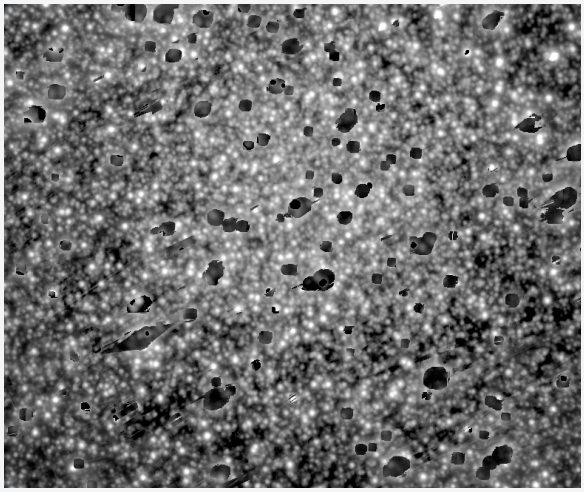
Ghosts

Bright sources can cause ghosting. The optical properties of the system are known well enough for the position of ghosts to be predicted and masked. However, some ghosts do slip though the system, or more often the mask is not quite large enough and some light is not removed.

Example of a partially masked ghost which has imprinted onto an r-band stack (the field is ~10' across).

Astrometry failures

On some stacks, if one or more input warps has poor astrometry this can imprint through to the stack (in particular, supposedly masked areas such as the centres of bright stars can show a background star field poking through). This is quite rare and mostly seen in crowded fields.



The centre of the Messier 22 i-band stack. Notice how faint images can been seen through the supposedly masked areas around bright stars.