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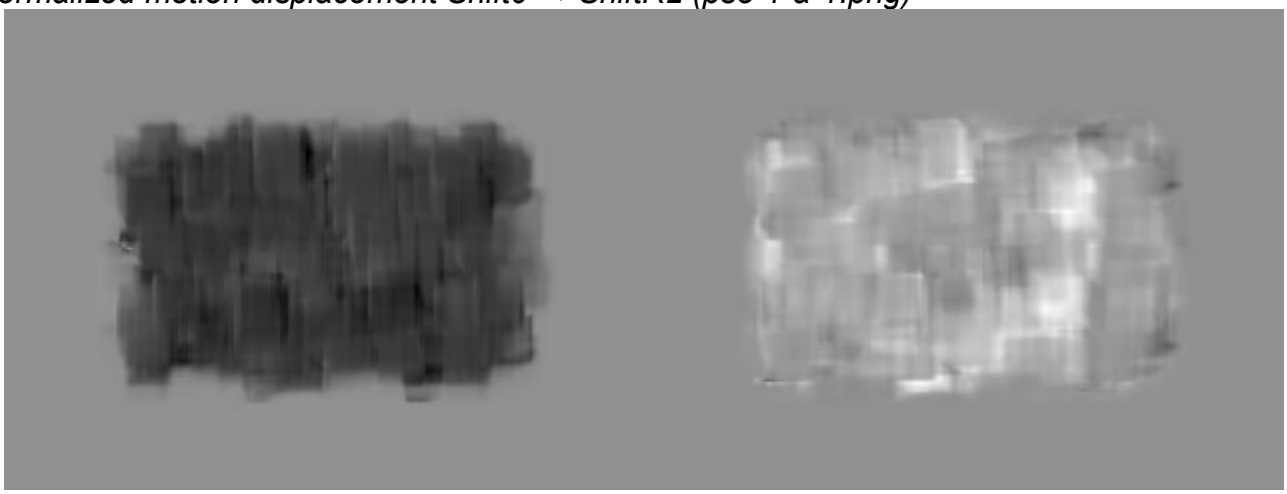
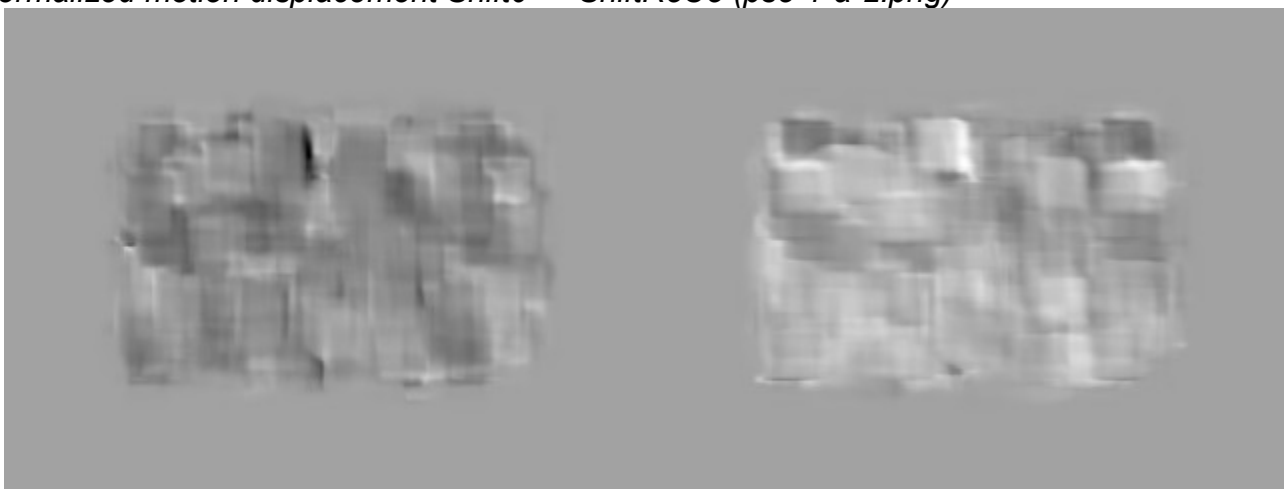
Problem Set 5: Optic Flow
CS4495, Spring 2015 OMS
GTID: 903050550

Part 1a:

normalized motion displacement Shift0 → ShiftR2 (ps5-1-a-1.png)



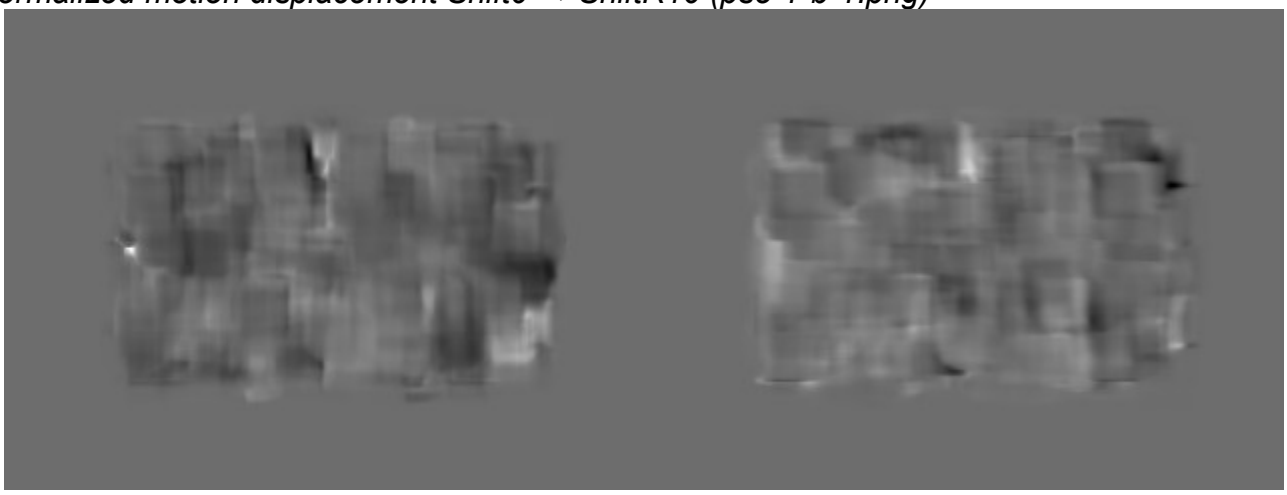
normalized motion displacement Shift0 → ShiftR5U5 (ps5-1-a-2.png)



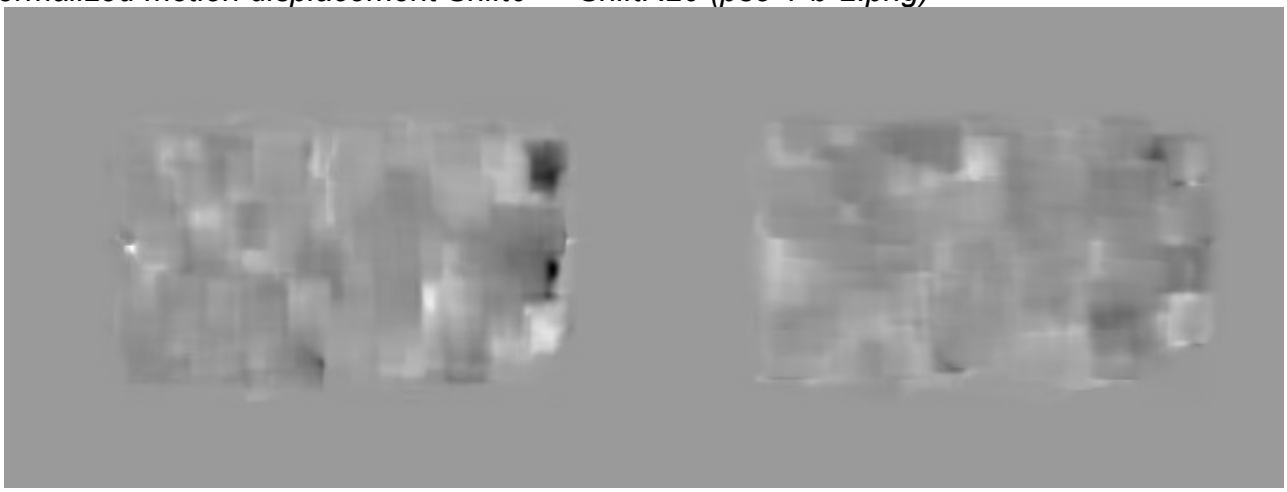
I tried a variety of blurs and found that it made only a small difference, so I analyzed the images without any blur.

Part 1b:

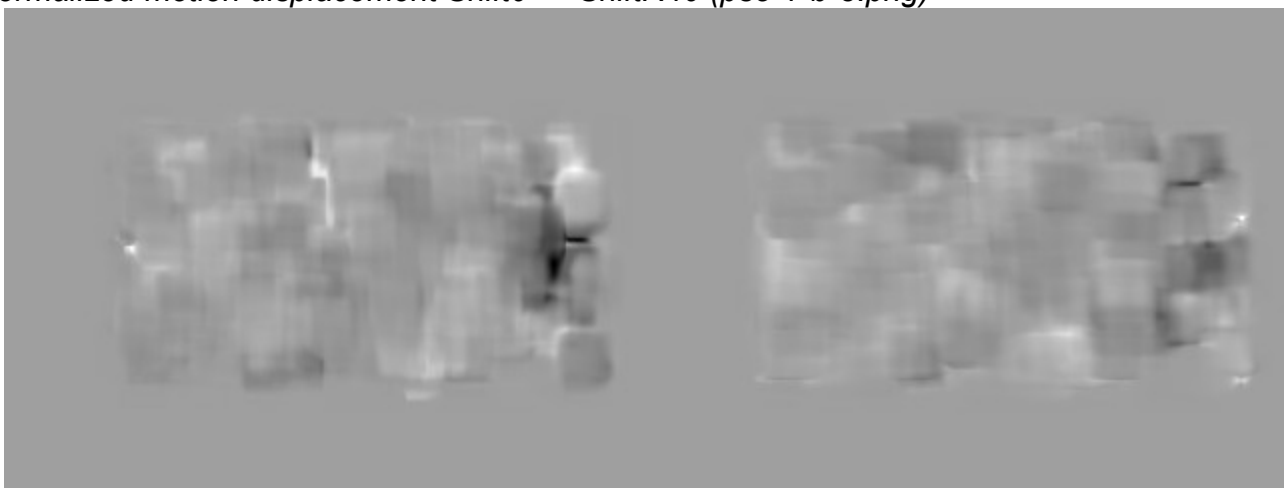
normalized motion displacement Shift0 → ShiftR10 (ps5-1-b-1.png)



normalized motion displacement Shift0 → ShiftR20 (ps5-1-b-2.png)

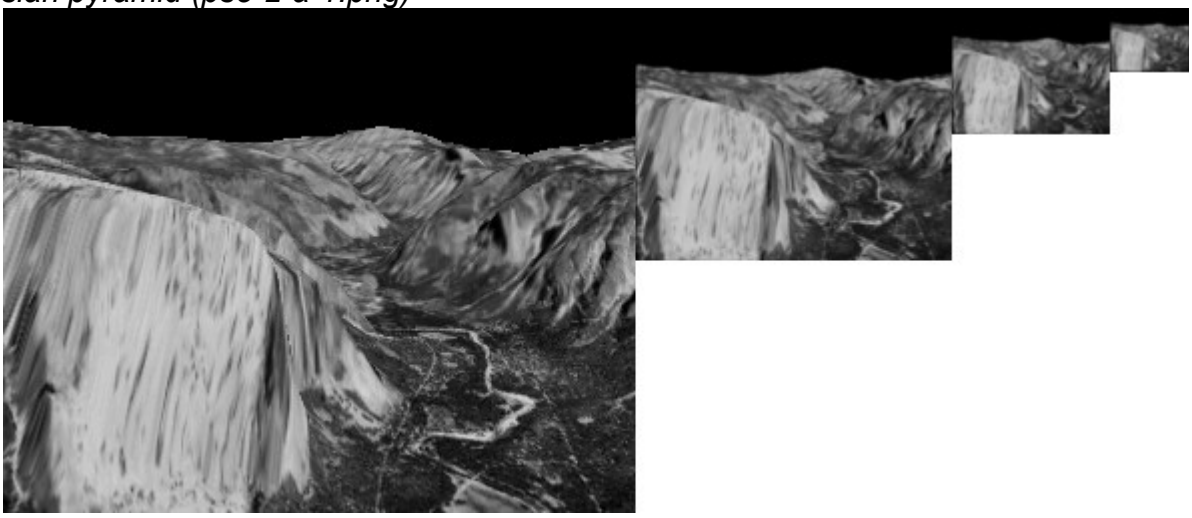


normalized motion displacement Shift0 → ShiftR40 (ps5-1-b-3.png)

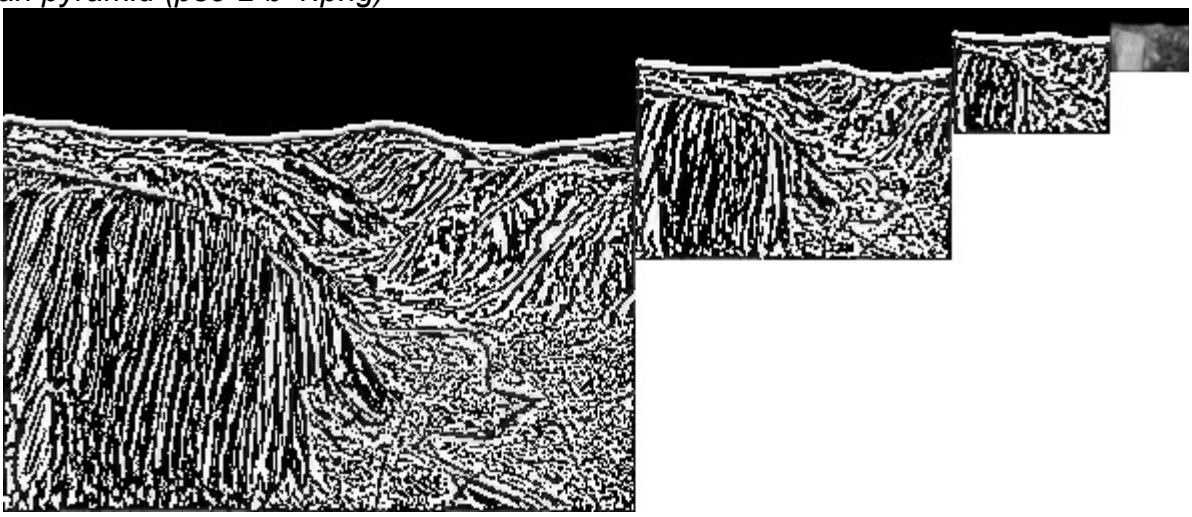


The optic flow field has more significant extrema but still correctly distinguishes the region that has movement. This is likely because the other regions have no pixel change, a 0 determinant, which is treated as 'invalid' or 'no-know-movement'.

Part 2a:
gaussian pyramid (ps5-2-a-1.png)

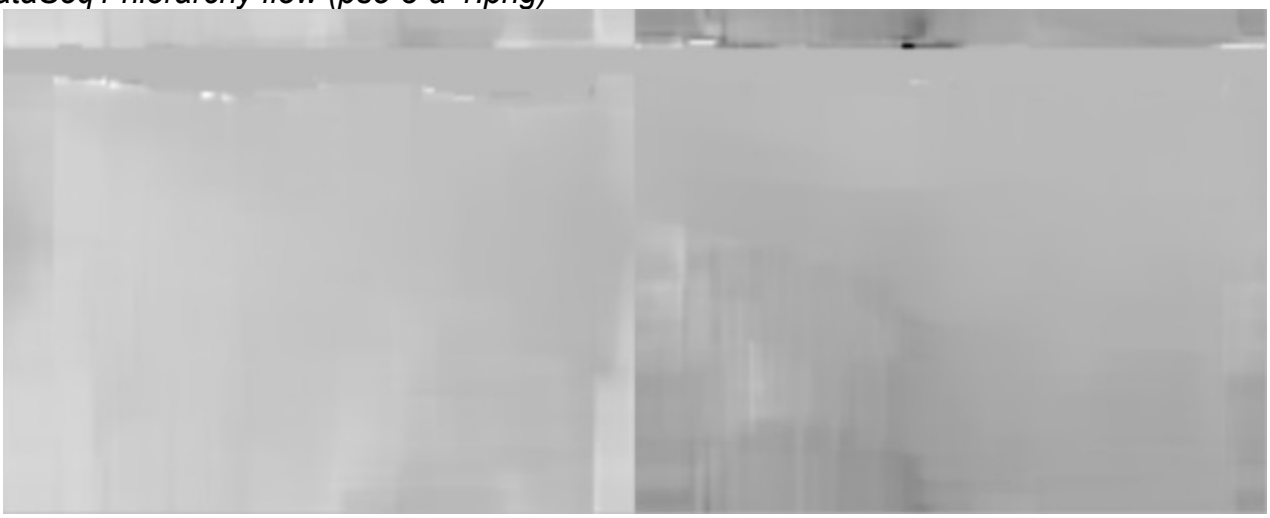


Part 2b:
lapcian pyramid (ps5-2-b-1.png)

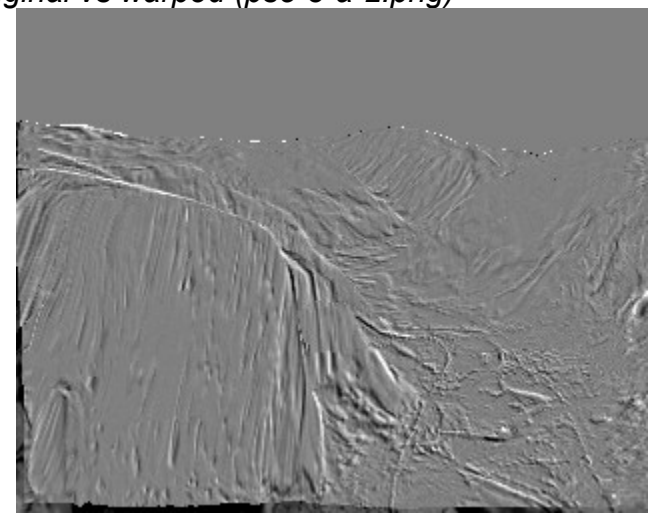


Part 3a:

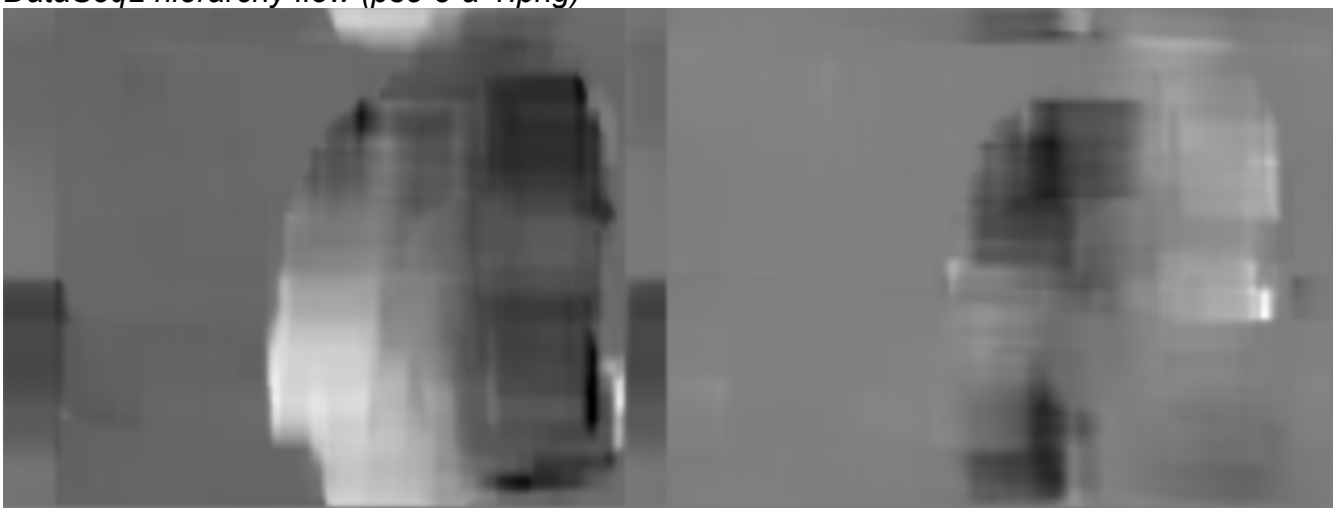
DataSeq1 hierarchy flow (ps5-3-a-1.png)



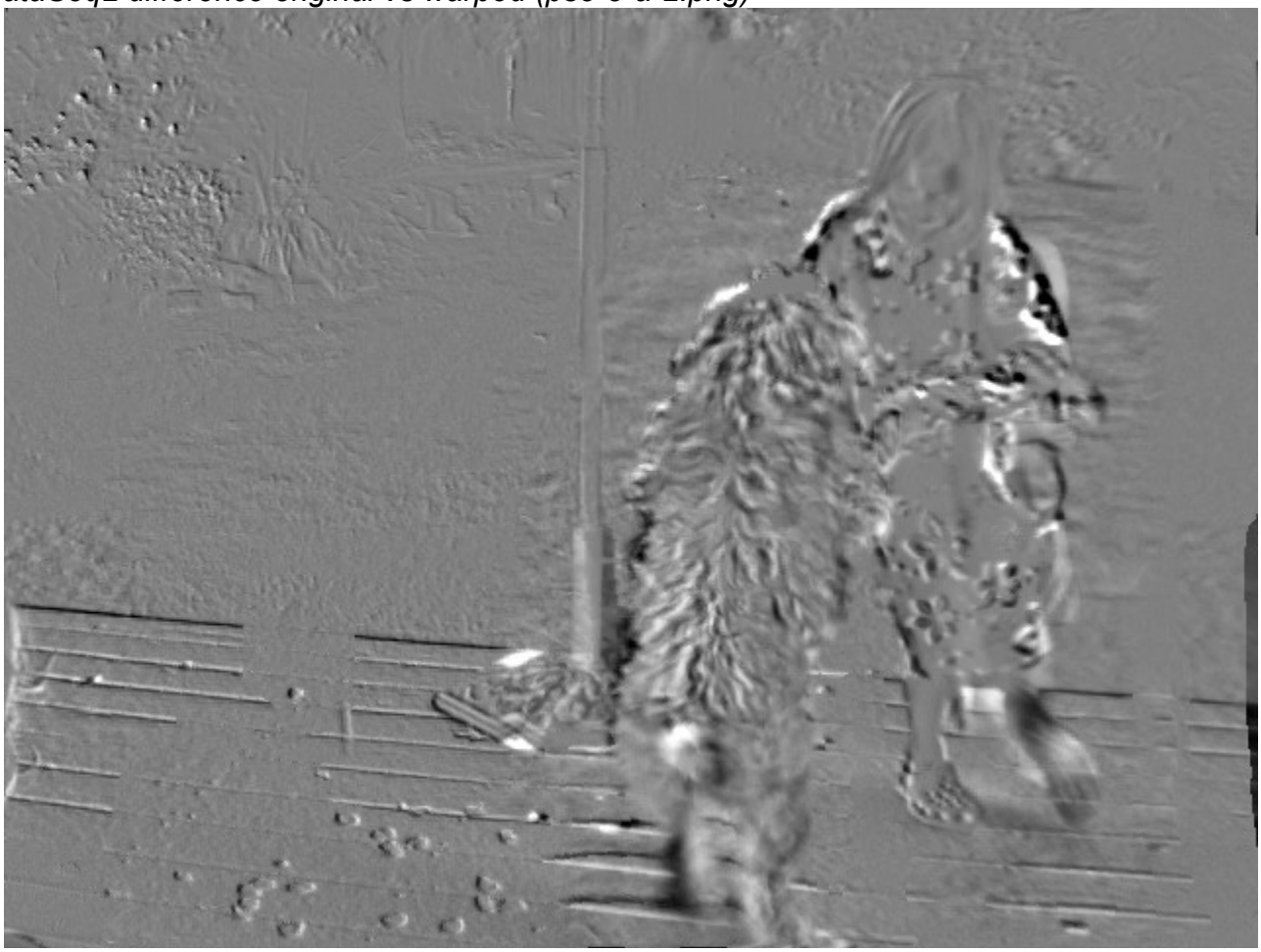
DataSeq1 difference original vs warped (ps5-3-a-2.png)



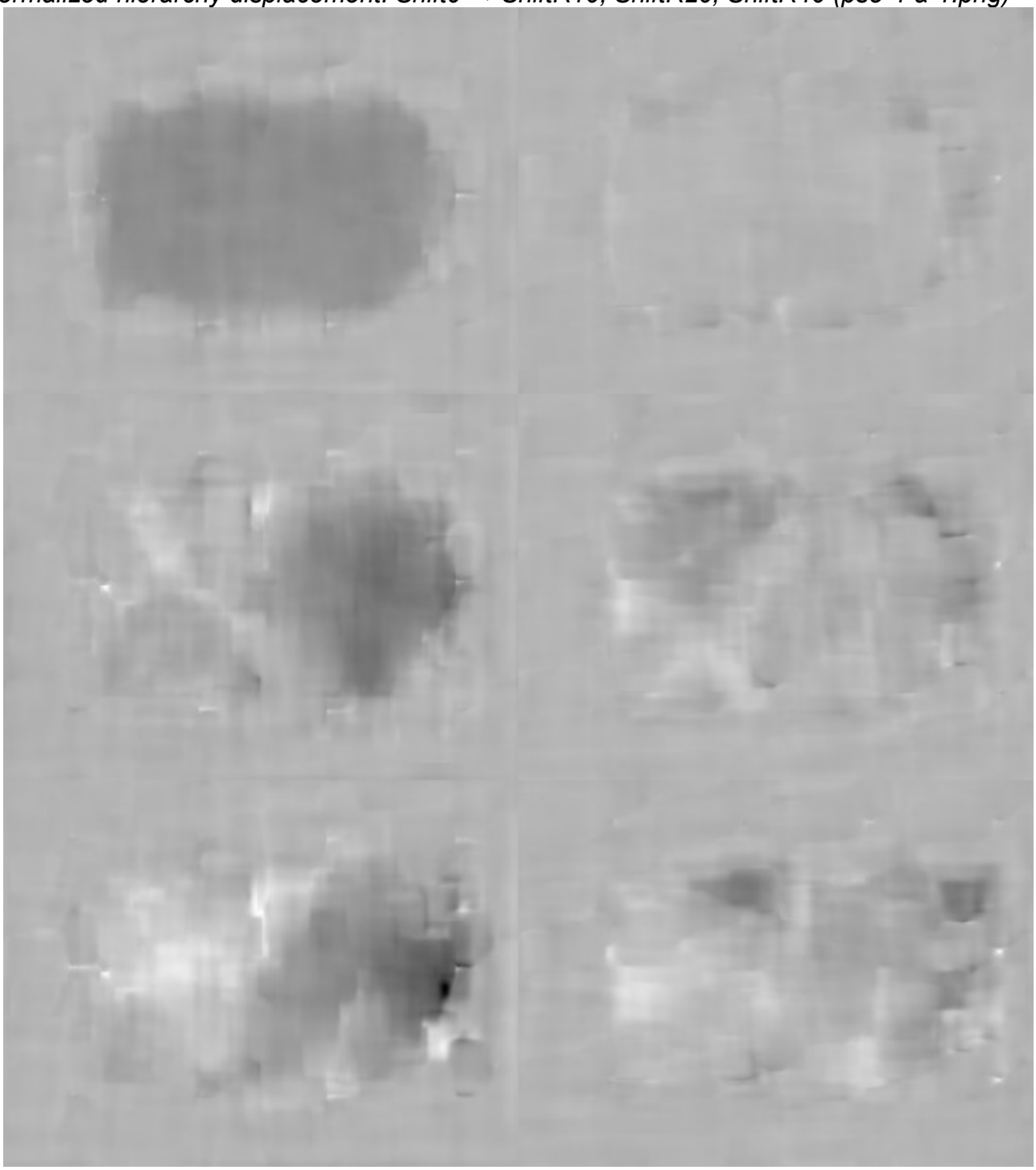
DataSeq2 hierarchy flow (ps5-3-a-1.png)



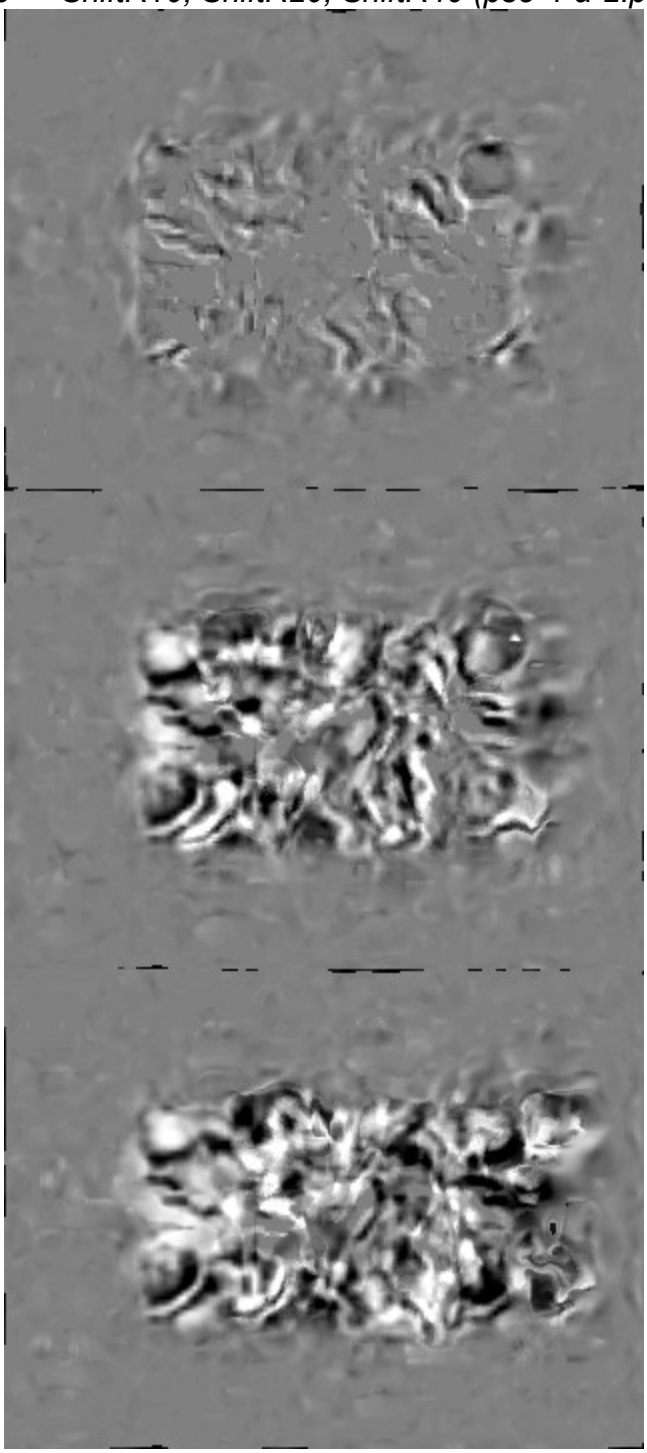
DataSeq2 difference original vs warped (ps5-3-a-2.png)



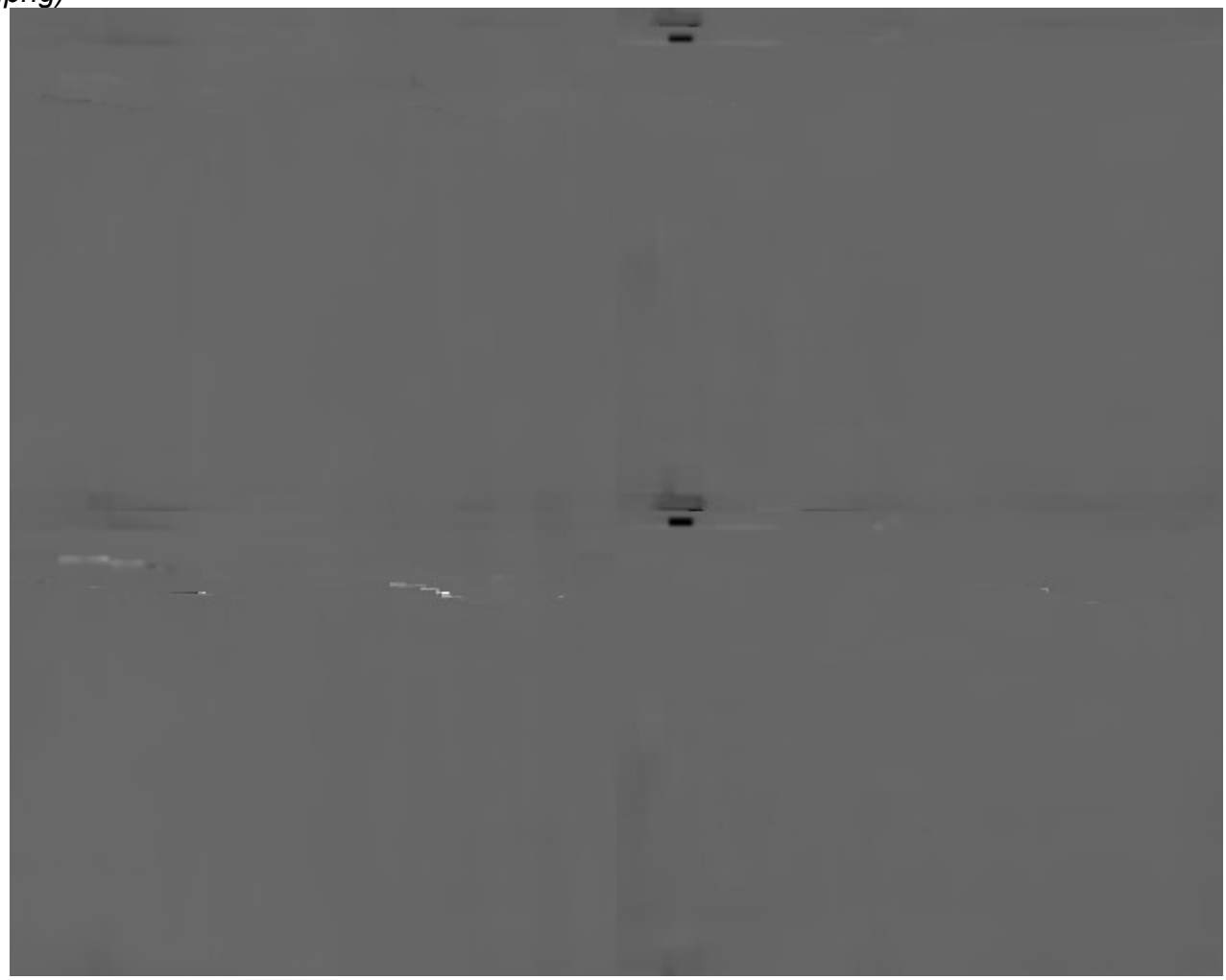
Part 4a:
normalized hierarchy displacement: Shift0 → ShiftR10, ShiftR20, ShiftR40 (ps5-4-a-1.png)



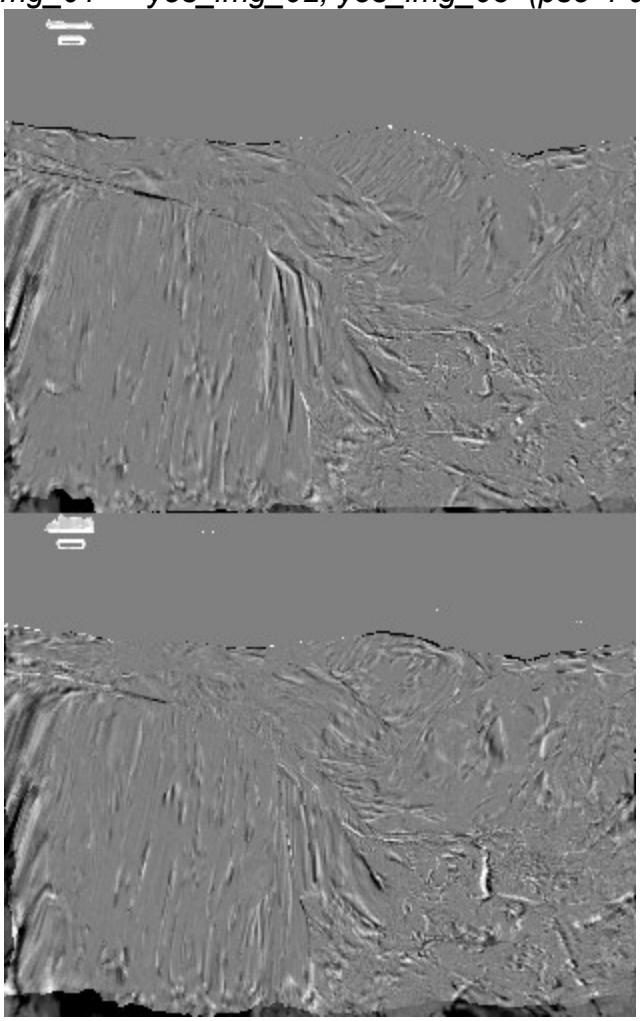
difference images: Shift0 → ShiftR10, ShiftR20, ShiftR40 (ps5-4-a-2.png)



Part 4b:
normalized hierarchy displacement: yos_img_01 → yos_img_02, yos_img_03 (ps5-4-a-3.png)

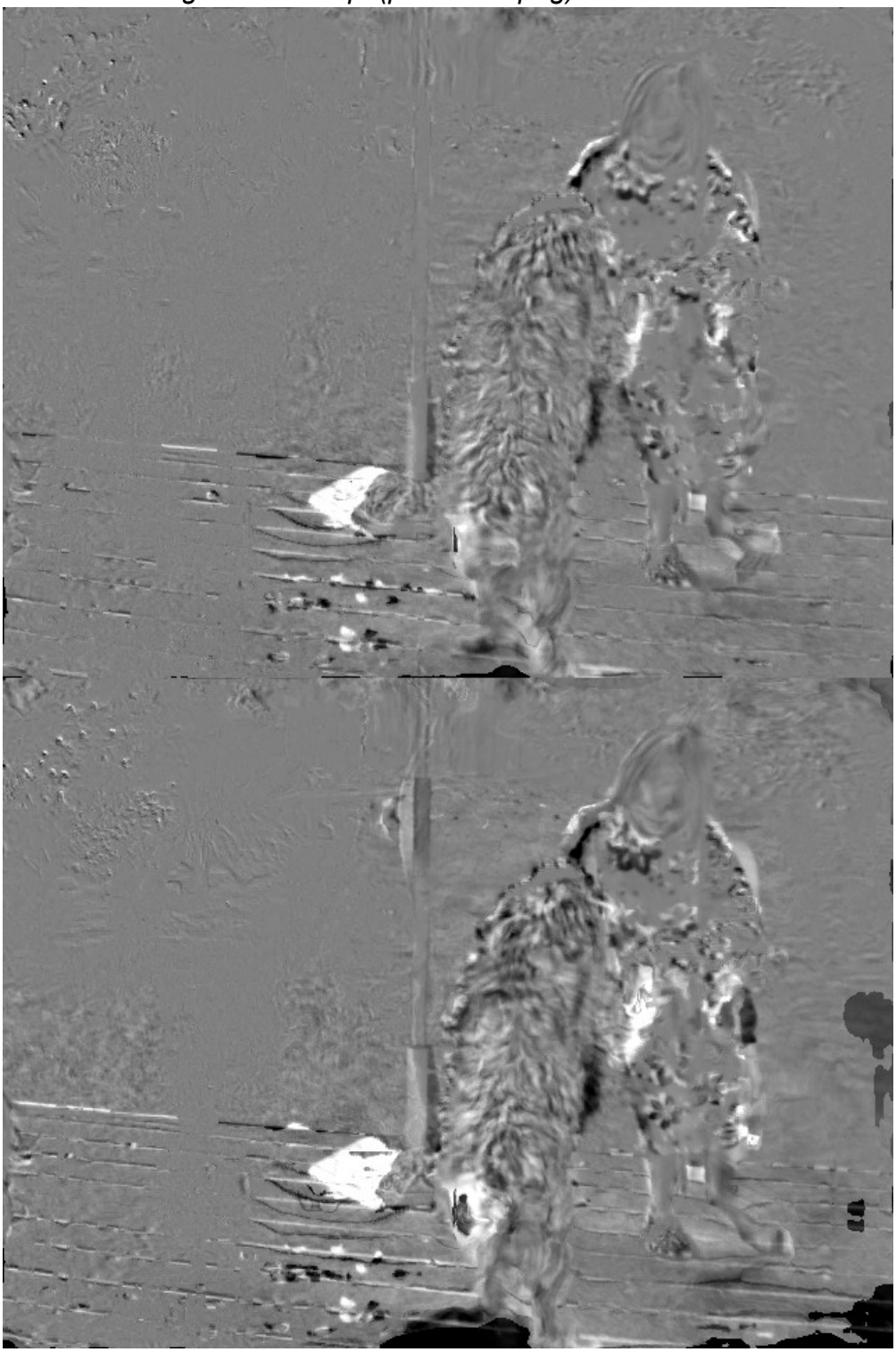


difference images: yos_img_01 → yos_img_02, yos_img_03 (ps5-4-a-4.png)



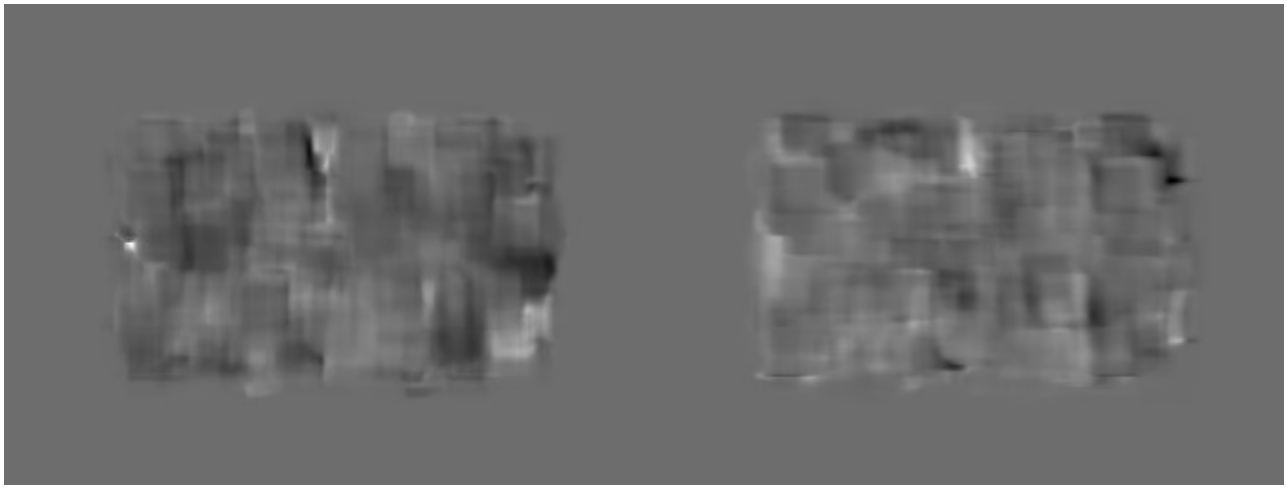
Part 4c:
normalized hierarchy displacement: DataSeq2 (ps5-4-a-5.png)

difference images: DataSeq2 (ps5-4-a-6.png)

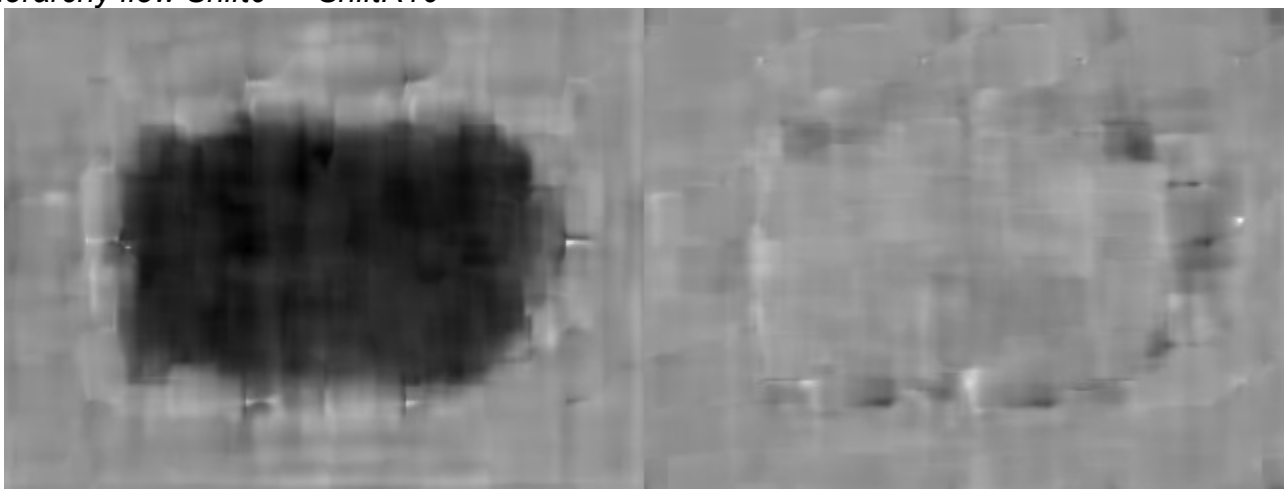


Addendum:
The hierarchy flow shows disappointing results for Dataseq1 and Dataseq2. I did some extra checking to see if the algorithms are working correctly. For Shift0 → ShiftR10 I compared the basic flow vs. the hierarchy flow. These results seem decent – certainly the hierarchy flow and warp do a better general job of capturing the most relevant changes. The flow shows very little change for the v-displacement. And the warped difference images have a lot of detail for the basic and very little for the hierarchy.

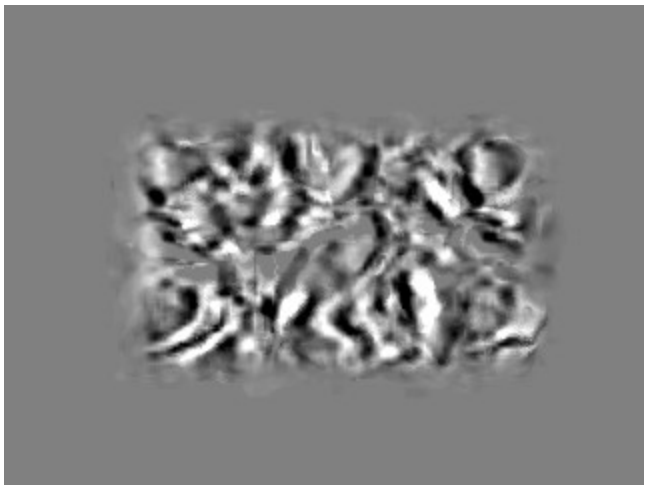
basic flow Shift0 → ShiftR10



hierarchy flow Shift0 → ShiftR10



warped basic difference



warped hierarchy difference