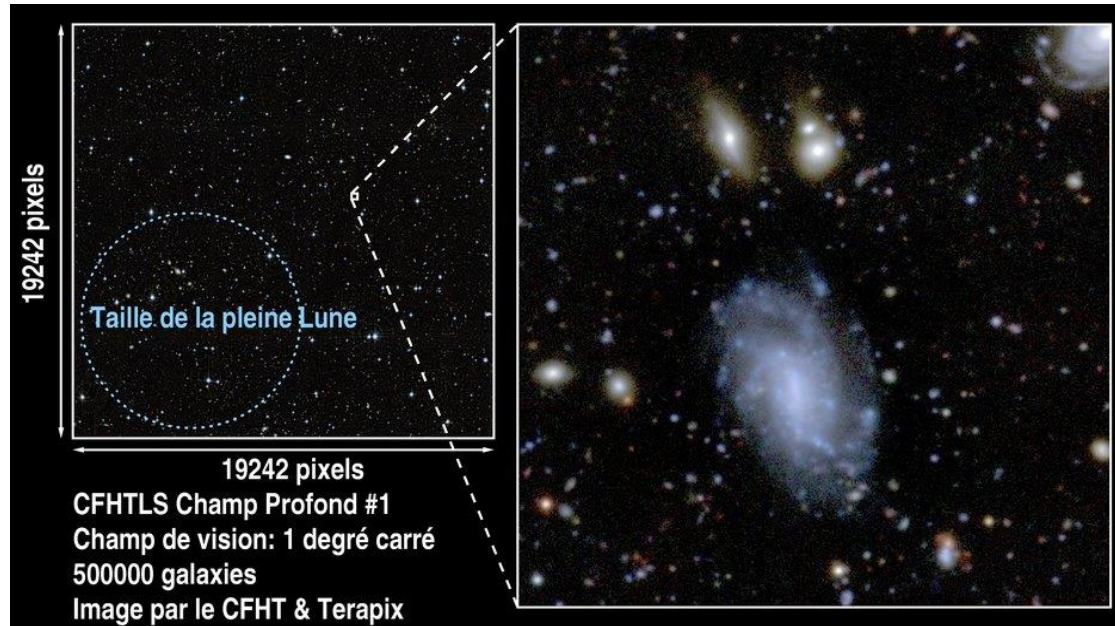


# Transient detection using LSST-Stack

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Supervisors: Dominique FOUCHÉZ and Marcela HERNÁNDEZ HOYOS

# Input and Validation Data



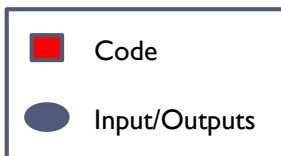
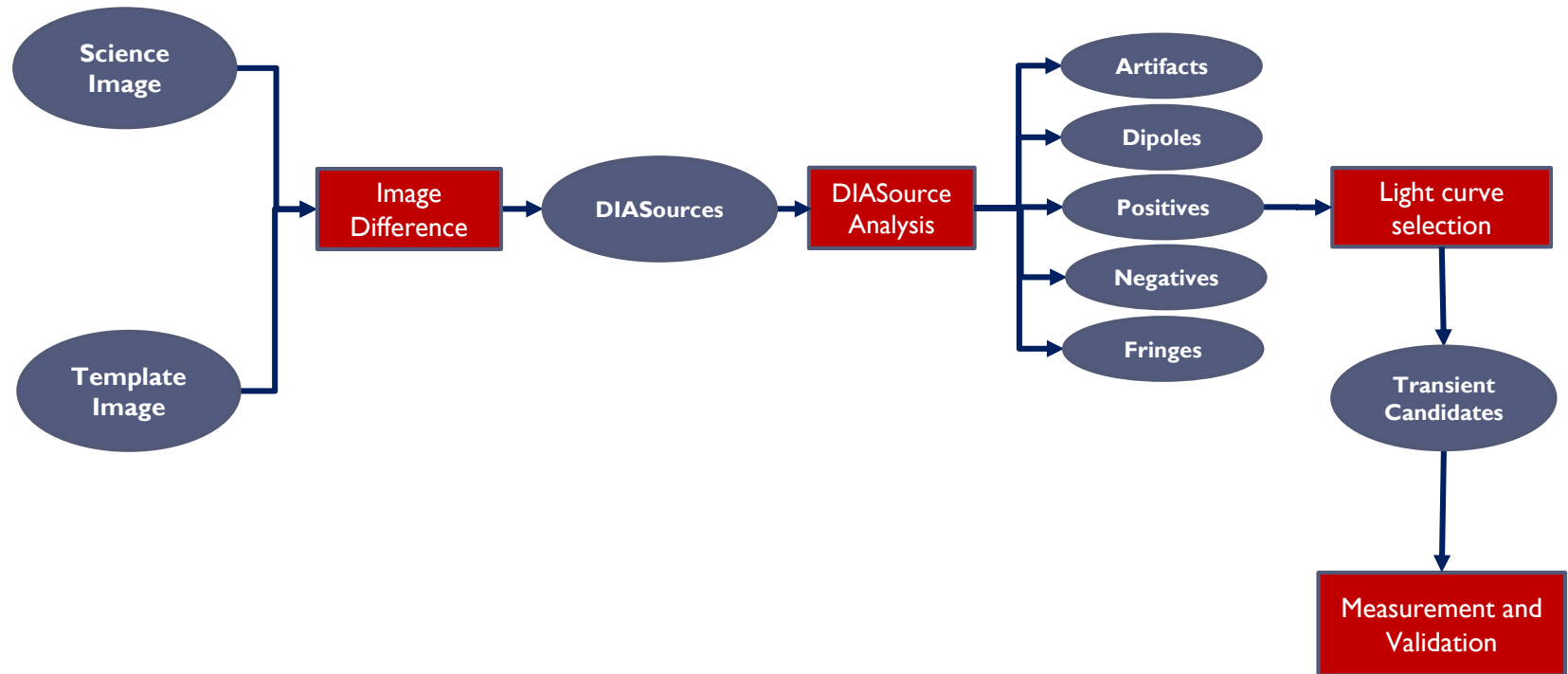
## ► Input: CFHT-LS

- *Deep Field D3*
- Observations every 3-4 on filter r

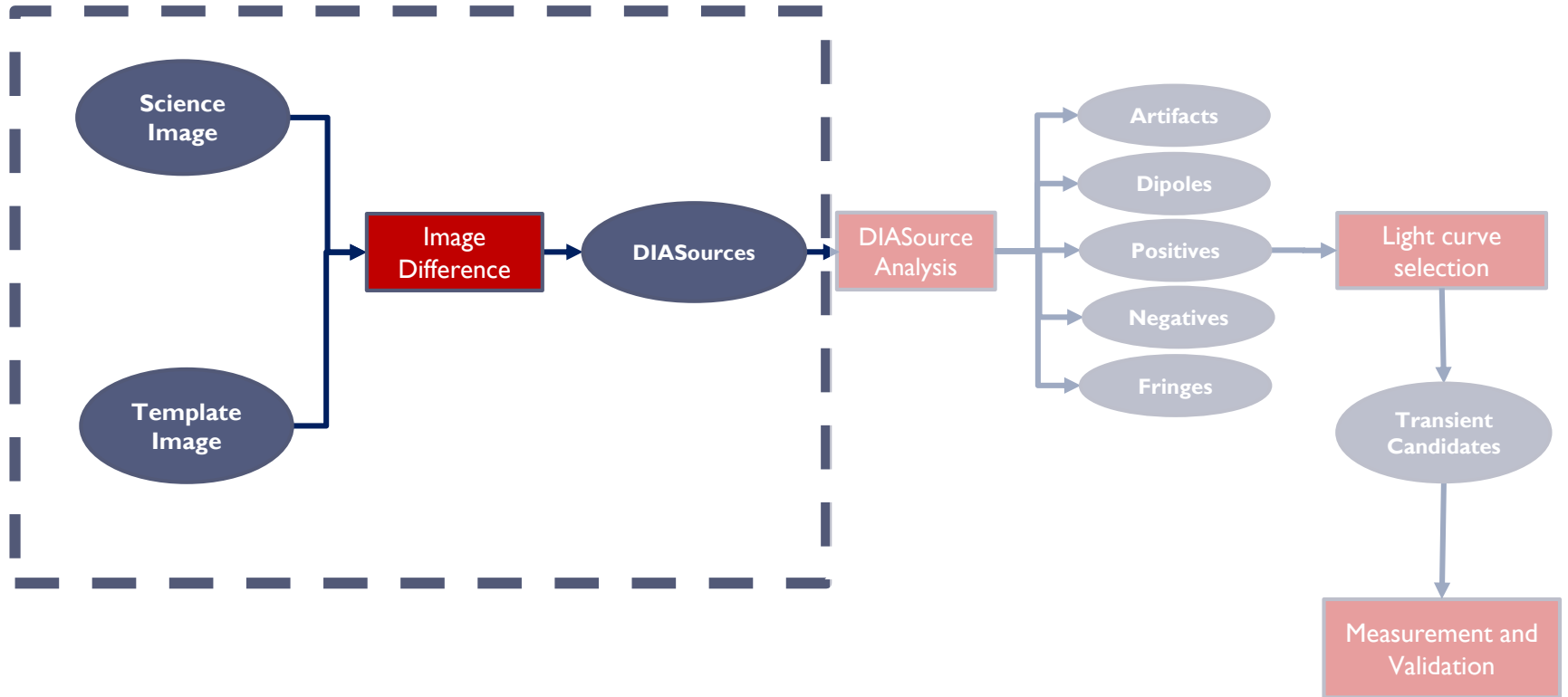
## ► Validation: SNLS:

- SN data from three first years of CFHT-LS
- 17 SN IA identified in input dataset.

# Transient Detection Pipeline



# Transient Detection Pipeline

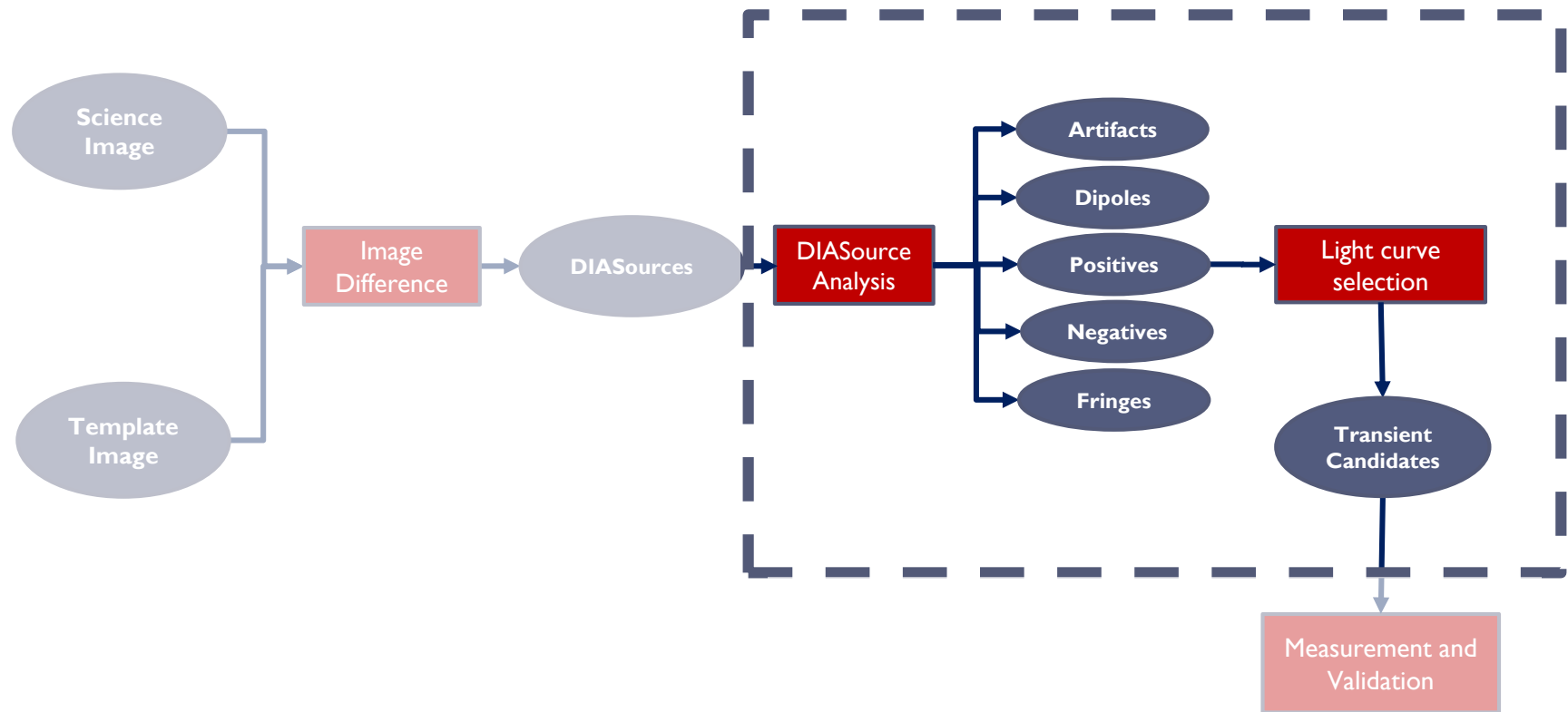


Code



Input/Outputs

# Transient Detection Pipeline



Code

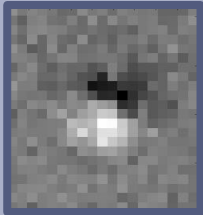


Input/Outputs

# DIASource Characterization

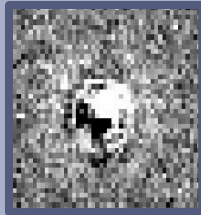
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Detections are classified using data from detection footprint. Refinement of this classification involves more sophisticated algorithms.



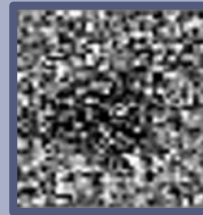
**Dipoles**

- Source misalignment
- Moving transients



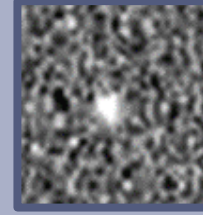
**Fringes**

- Inaccurate PSF-matching for subtraction



**Negative**

- Signals on reference image.

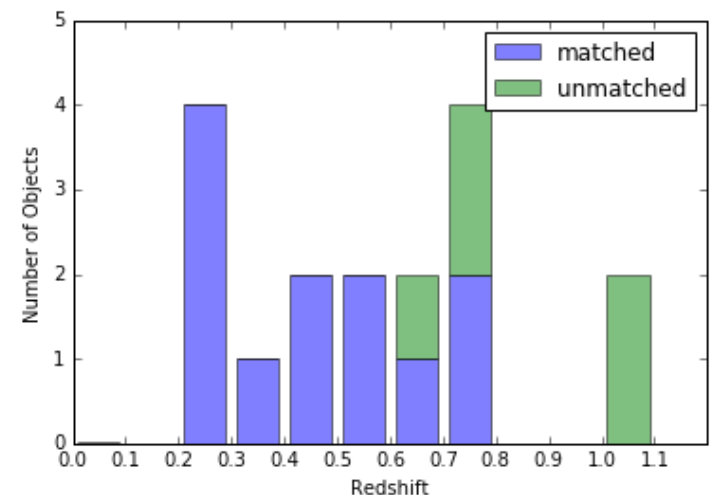
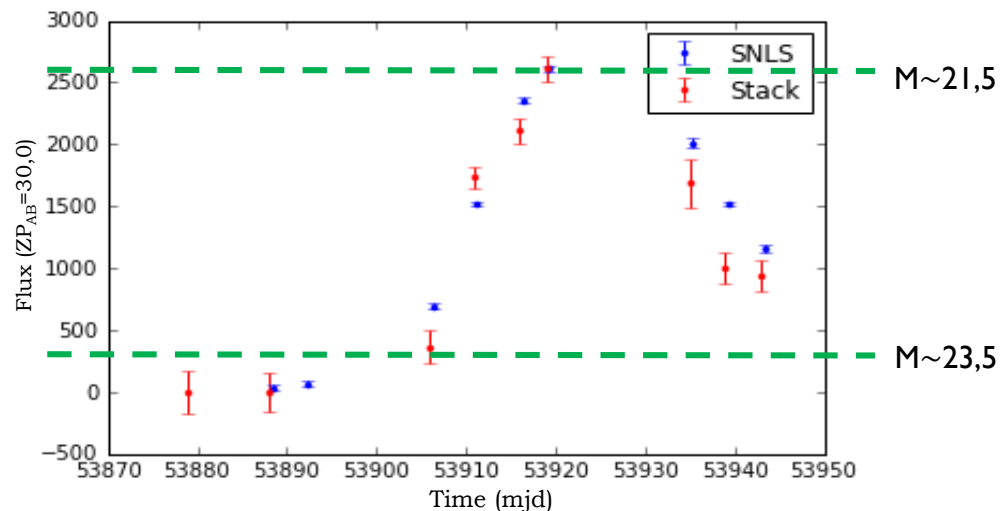


**Positive**

- Transient candidates.
- Residual flux from bright sources.

# Transient Detection Efficiency

- ▶ Light curve comparison with SNLS SN Ia and Pipeline candidates. 70% of SNLS SN Ia were matched (corresponding to  $z < 0.7$ ).



# Perspectives

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- ▶ Perform artifact classification using Machine Learning approximations/algorithm.
- ▶ Reduce pool of artifacts and increase candidate accuracy by improving quality of subtractions.
- ▶ Reprocess all CFHT Deep fields for transient detection.