

All-Weather Deep Outdoor Lighting Estimation

Jinsong Zhang*, Kalyan Sunkavalli†, Yannick Hold-Geoffroy†, Sunil Hadap†, Jonathan Eisenmann†, Jean-François Lalonde*
 *Université Laval, †Adobe Research

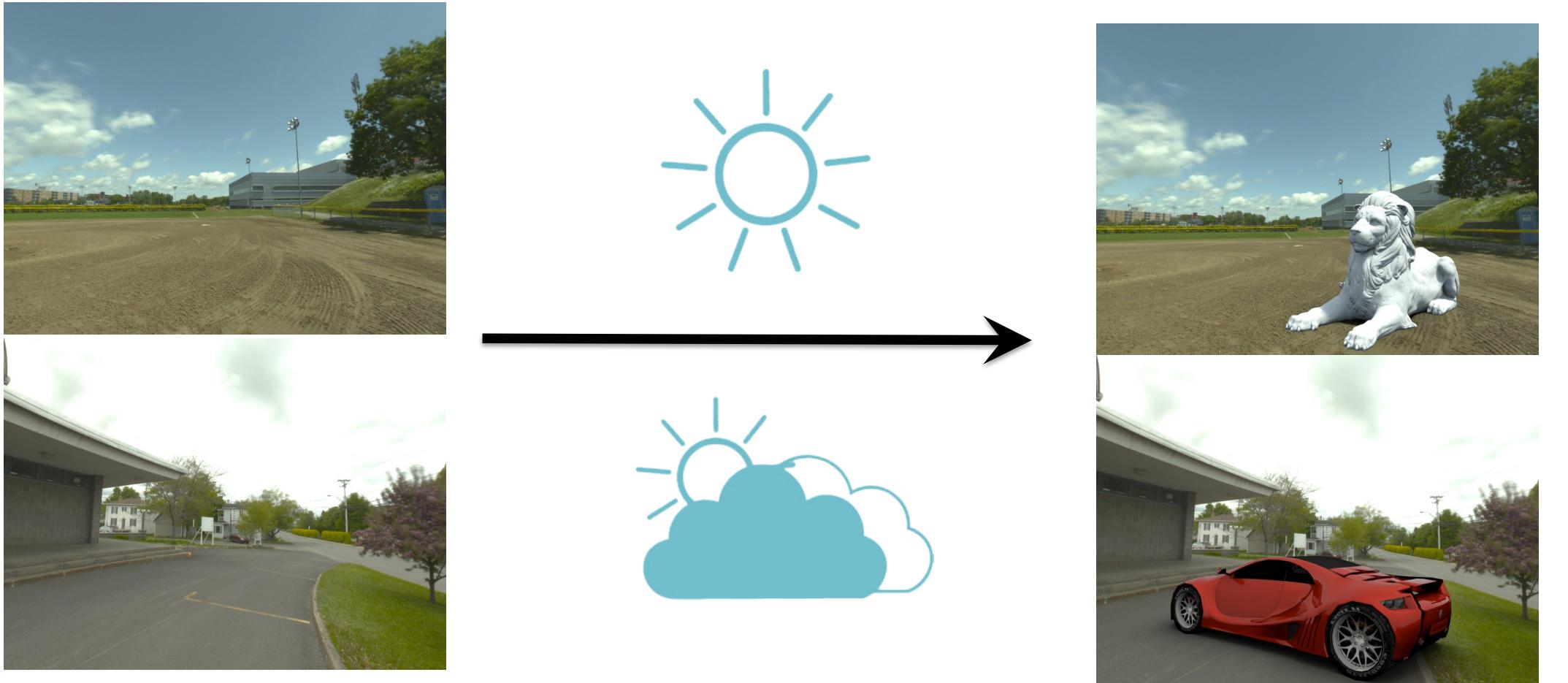
<http://lvsn.github.io/allweather>



LONG BEACH
CALIFORNIA
June 16-20, 2019

Motivation

Estimate outdoor lighting under any weather conditions.



Previous work [H-G'17] works for sunny days.

Approach

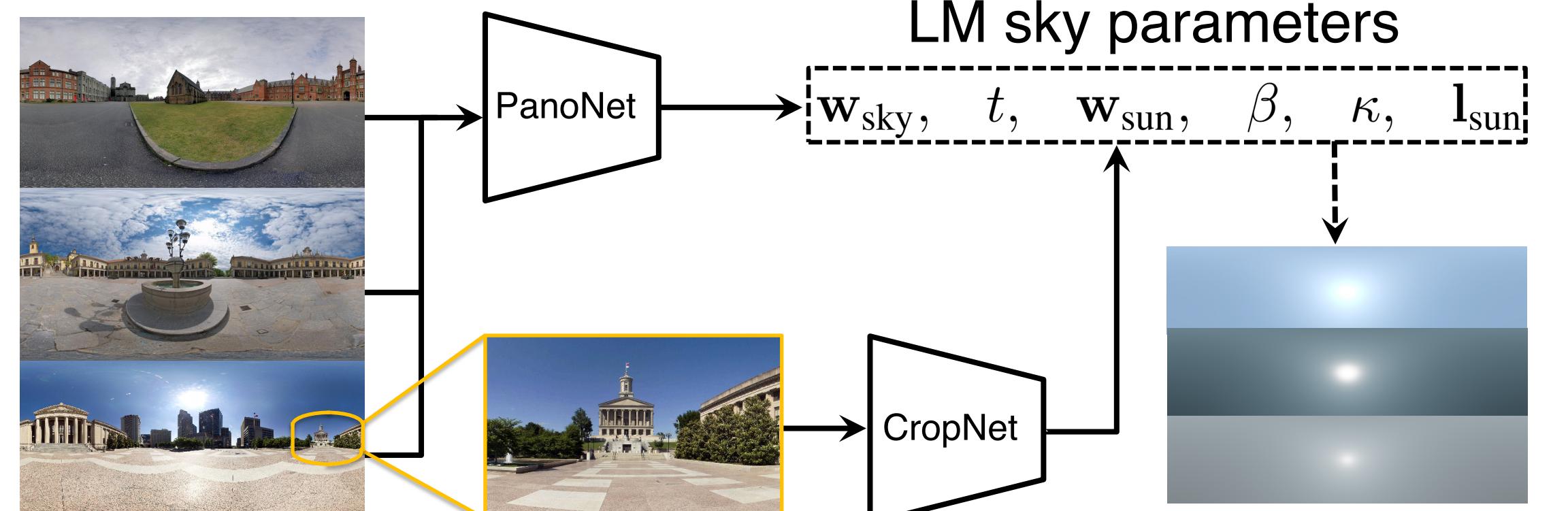
Lalonde-Matthews sky model

$$f_{LM} = f_{sun}(l; q_{sun}, l_{sun}) + f_{sky}(l; q_{sky}, l_{sun})$$

Shape of the sun Angle to the sun
 Zenith angle Sky turbidity

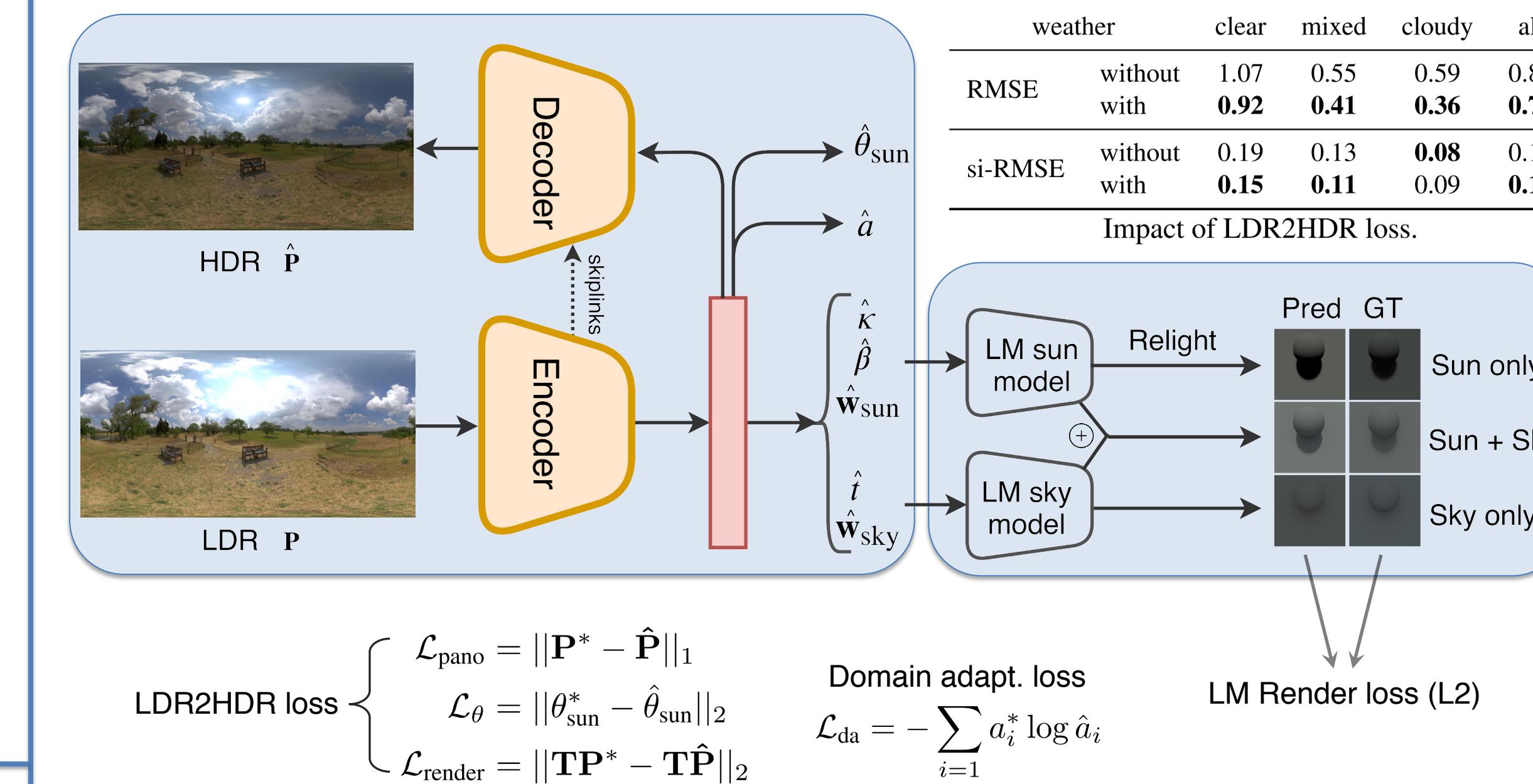
Challenge:

How to fit LM sky parameters to LDR panoramas.



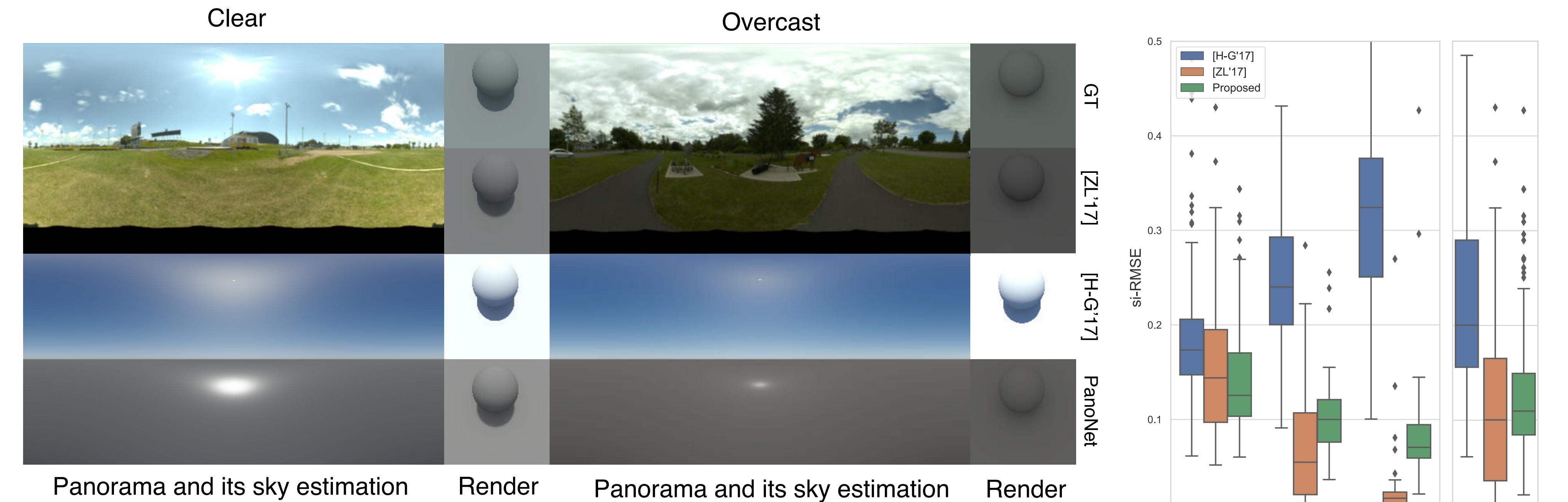
1. PanoNet is used to label LDR panoramas.
2. CropNet is used to estimate LM labels from crops.

PanoNet

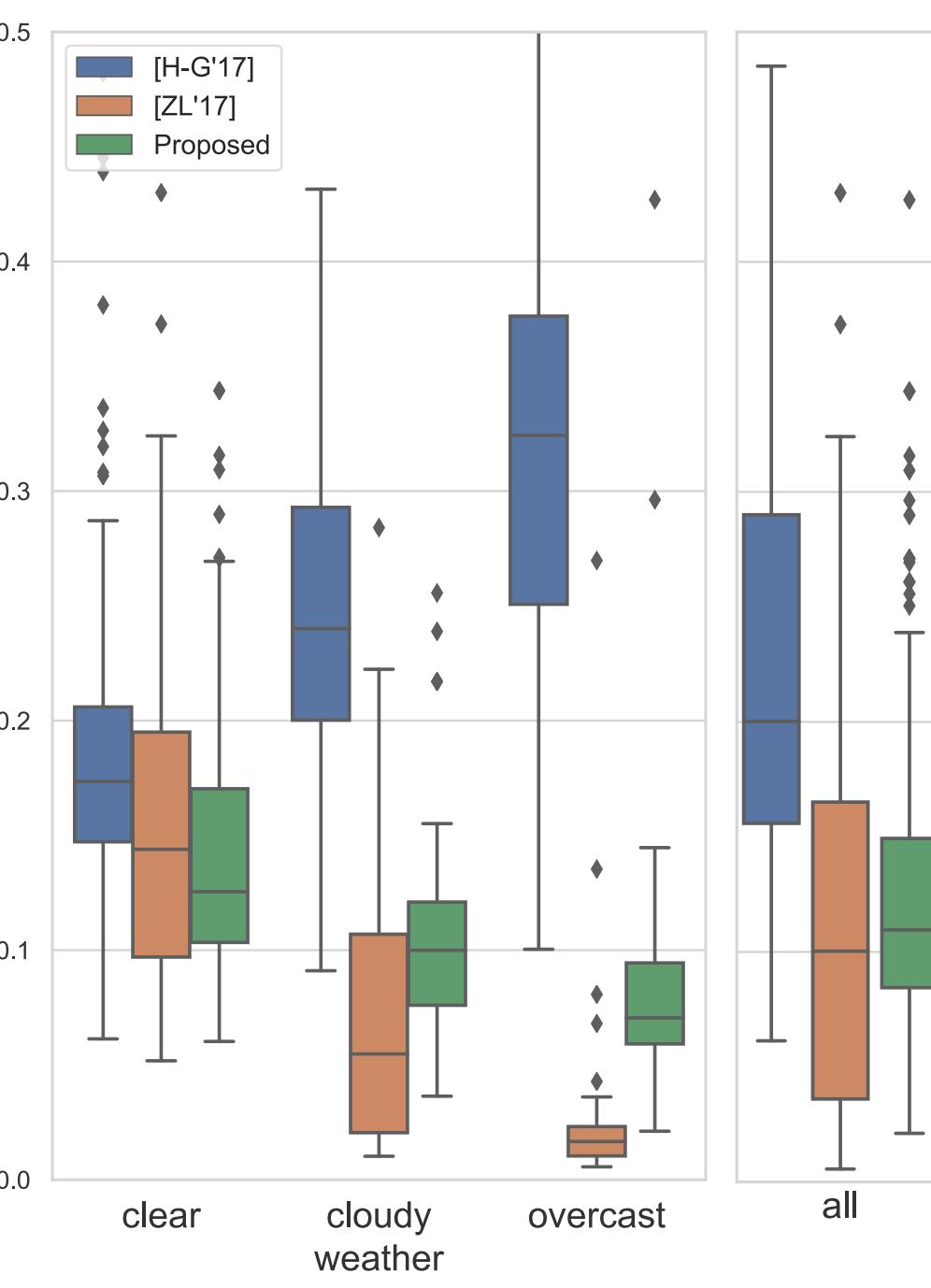


To train PanoNet, we rely on HDR (hdrhaven.com, outdoor.hdrdb.com, [ZL'17]) and LDR (SUN360, Google Street View) panoramas.

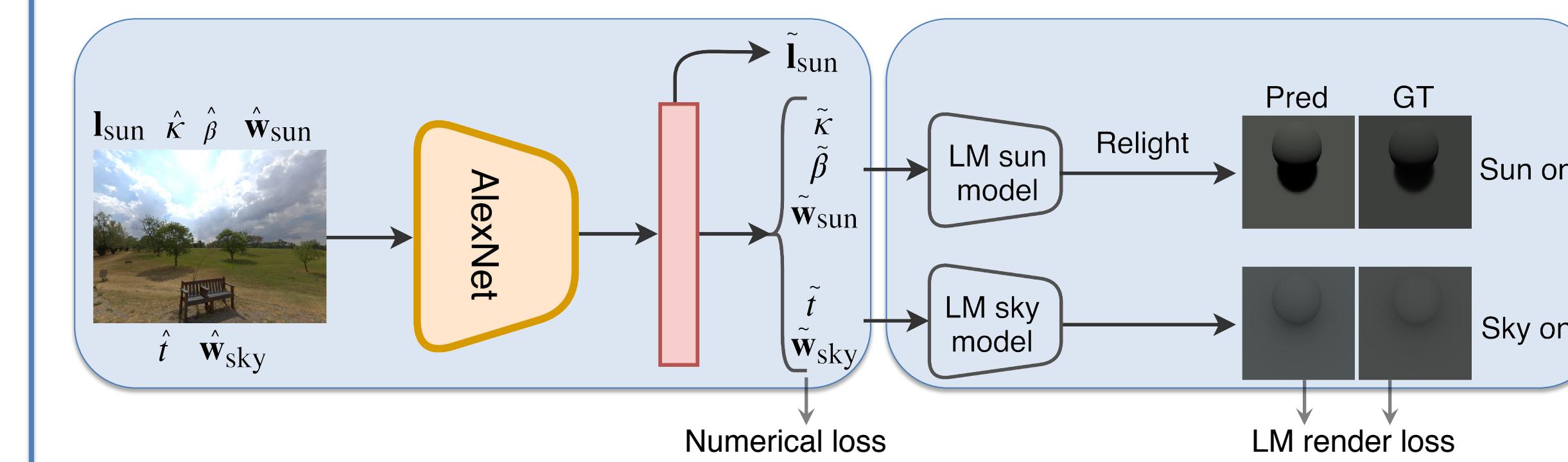
Qualitative results



Quantitative result

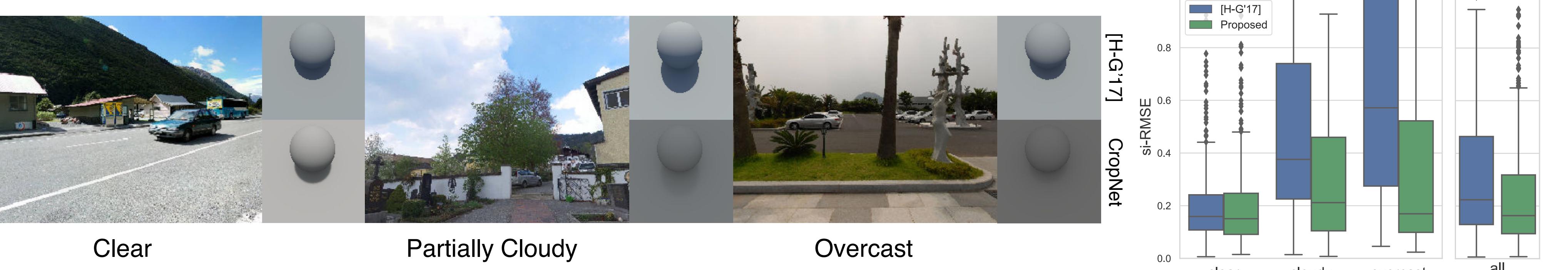


CropNet

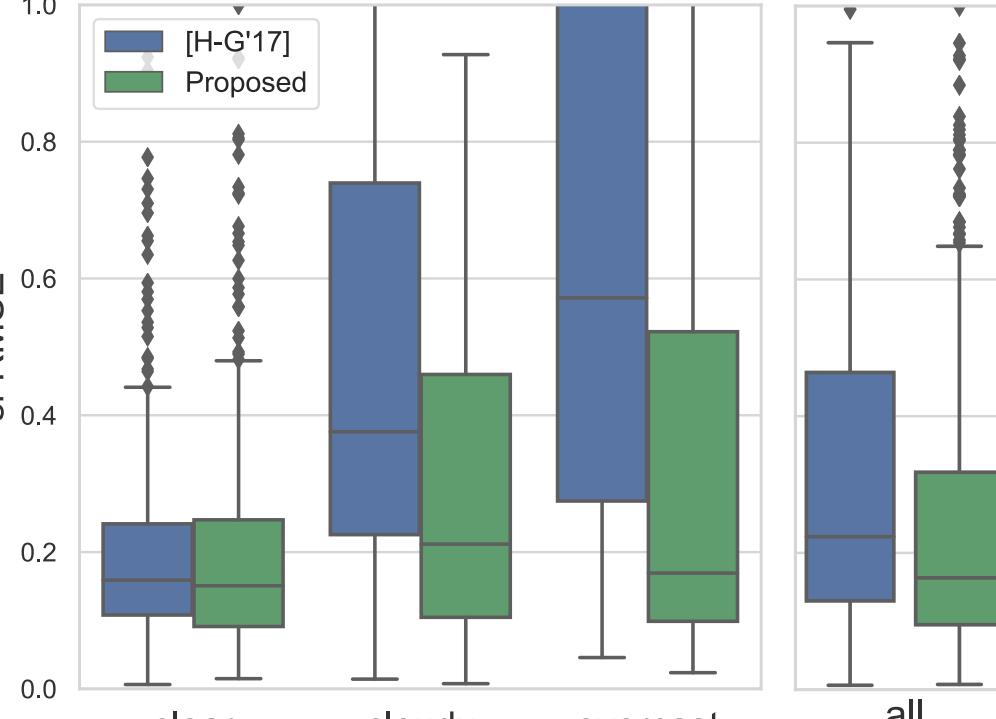


To train CropNet, we extract limited field of view crops from the SUN360 dataset.

Qualitative results



Quantitative result



Virtual object insertion

