Water Resources Research

Supporting Information for

Multi Attention Neural Network for Digital Rock CT Images Super-Resolution

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Introduction

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- Additional qualitative comparison on the coal test set and their difference maps;
- Additional qualitative comparison on the sandstone test set and their difference maps;
- Additional qualitative comparison on the carbonate test set and their difference maps.

Text S1.

Our codes are publicly available at https://github.com/MHDXing/MASR-for-Digital-Rock-Images. All experiments and algorithm details are in this open source project.

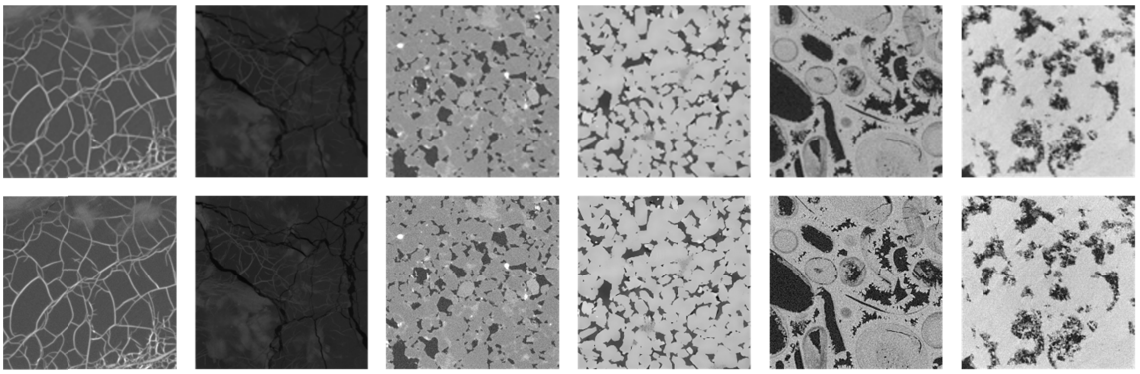

Figure S1. Sample slices of training dataset. First row: Low resolution images, i.e., inputs to the model. Second row: Corresponding high resolution images, i.e. ground truth. In the training stage, the model calculates the loss between the output and the ground truth, and optimizes the parameters by back propagation algorithm to make the output as close as possible to the ground truth

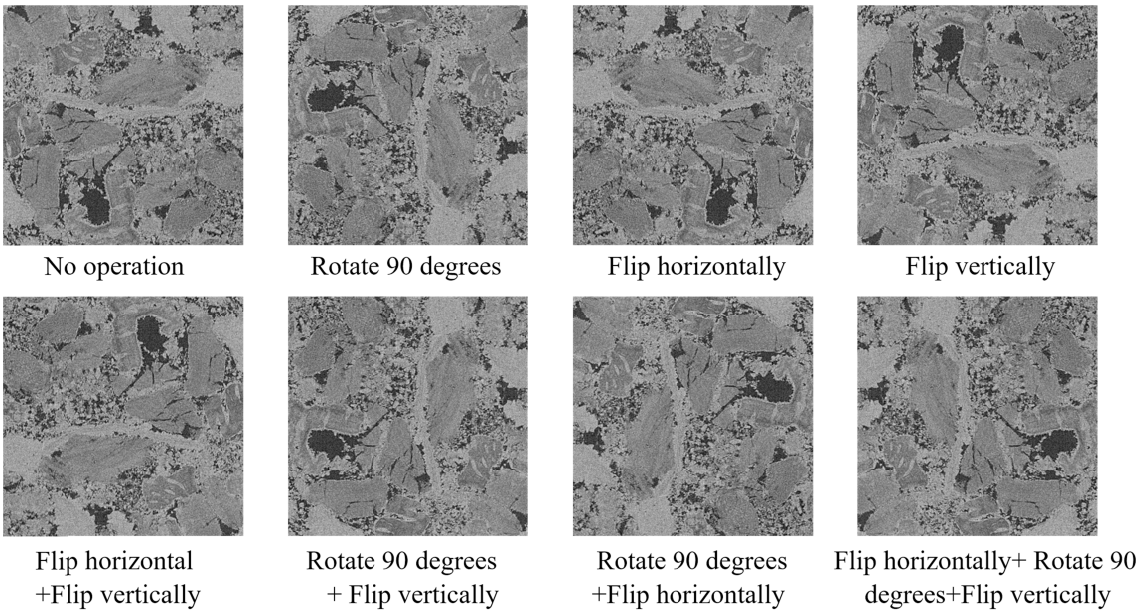

Figure S2. Data augmentation method in this research. In the training stage, the inputs are randomly flipped horizontally, flipped vertically or rotated to enhance the generalization of the model.

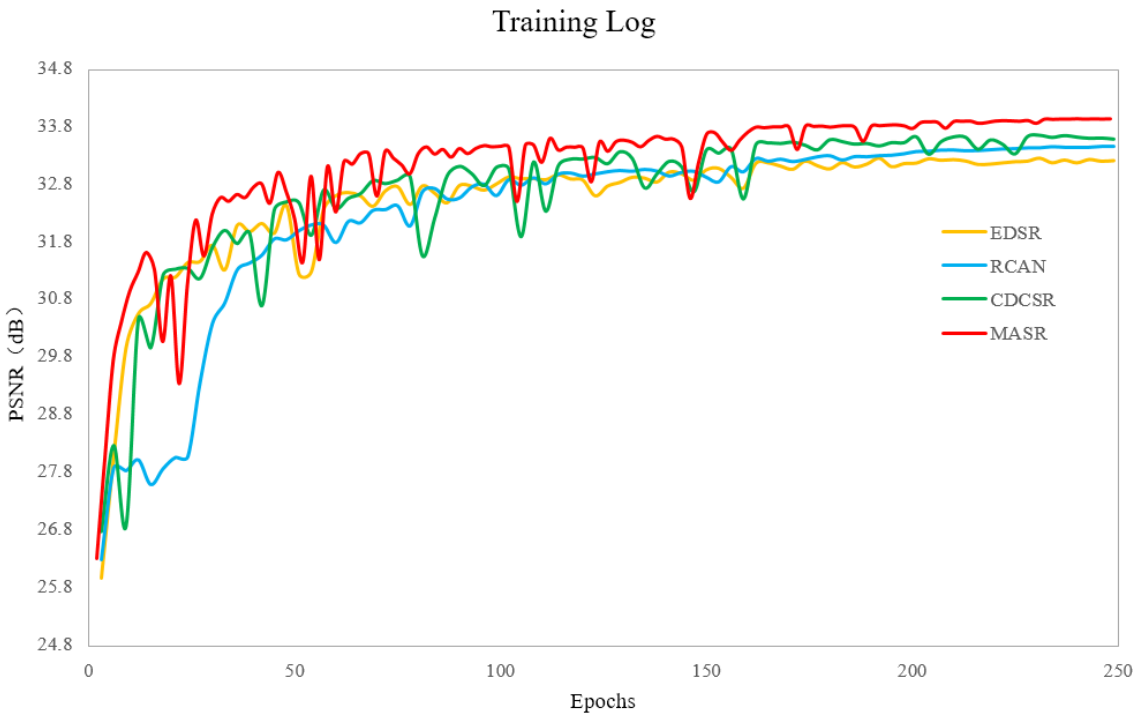

Figure S3. The average Peak Signal-to-Noise Ratio (PSNR) of the super-resolution models on the validation set during training. Our proposed model (MASR) converges faster and better.

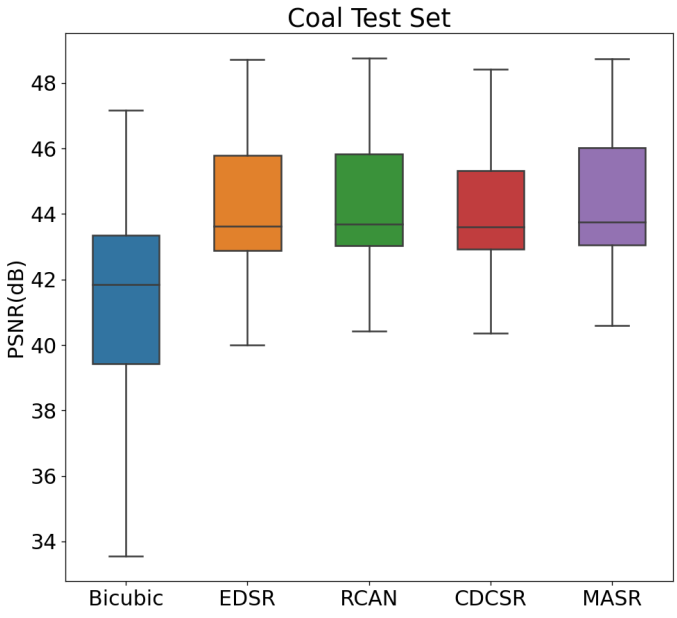

Figure S4. Boxplot of the average PSNR of EDSR, RCAN, CDCSR and MASR on coal test set. The subplot of Figure 8 in the main article.

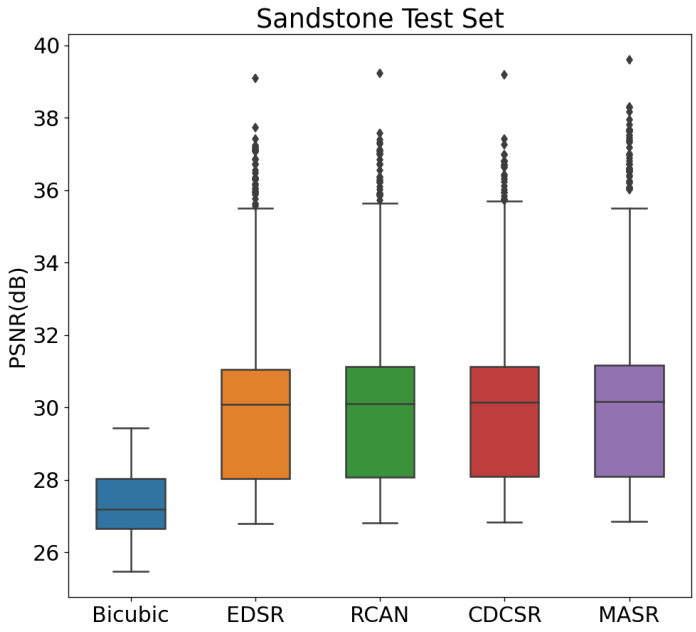

Figure S5. Boxplot of the average PSNR of EDSR, RCAN, CDCSR and MASR on sandstone test set. The subplot of Figure 8 in the main article.

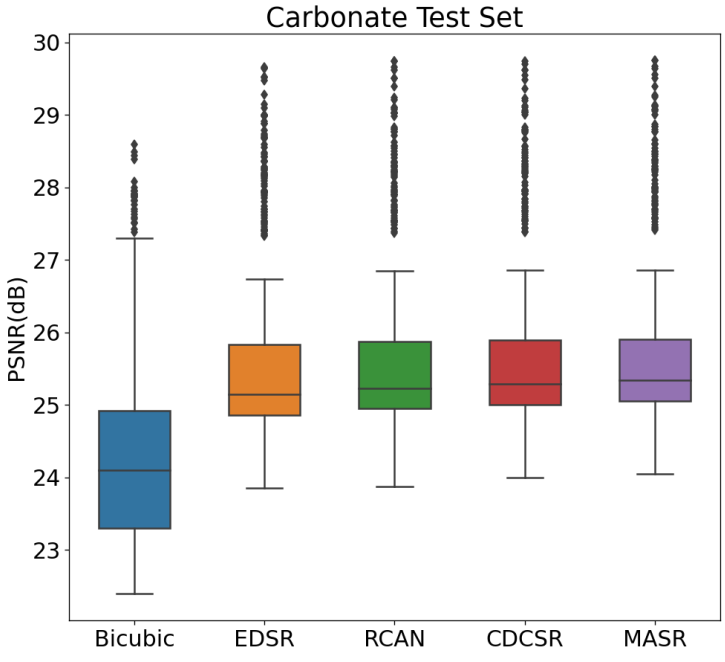

Figure S6. Boxplot of the average PSNR of EDSR, RCAN, CDCSR and MASR on carbonate test set. The subplot of Figure 8 in the main article.

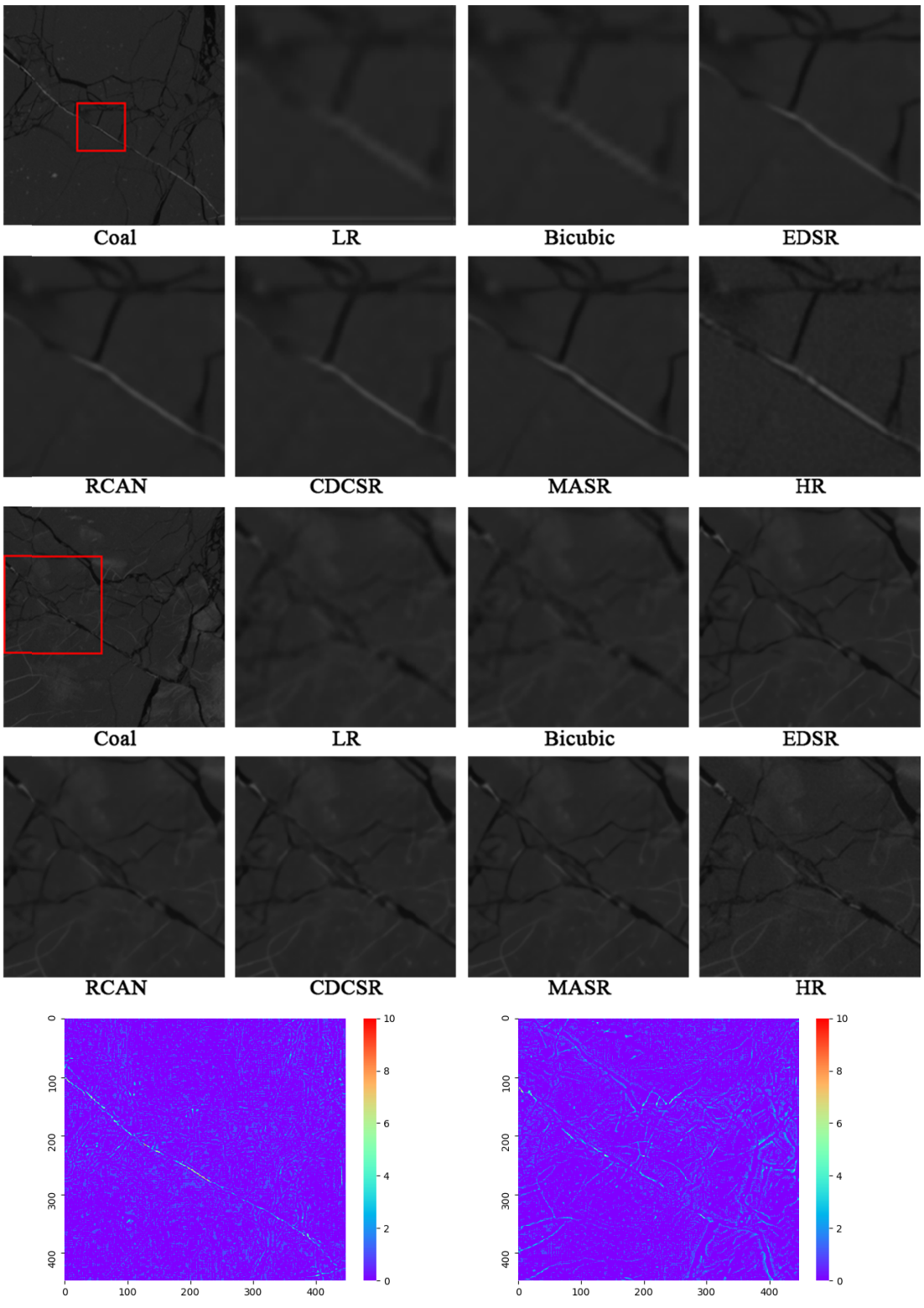

Figure S7. Additional qualitative comparison of our model with other works at ×4 SR on the coal test set. Bottom: Difference maps of MASR and RCAN SR results in the above two sets of images (MASR minus RCAN). The difference maps show that the edge recovered by MASR is sharper.

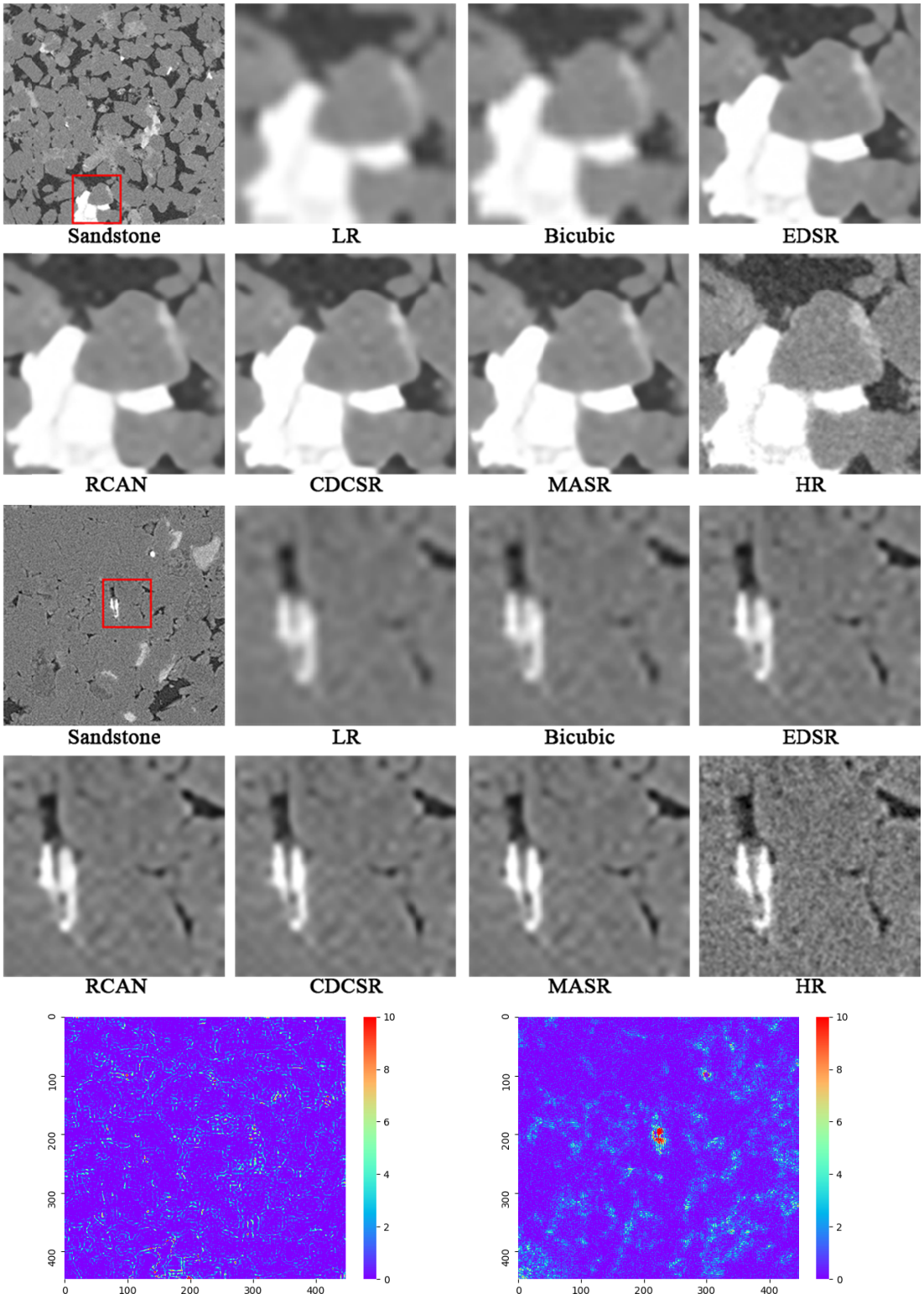

Figure S8. Additional qualitative comparison of our model with other works at ×4 SR on the sandstone test set. Bottom: Difference maps of MASR and RCAN SR results in the above two sets of images (MASR minus RCAN). The difference maps show that the edge recovered by MASR is sharper.

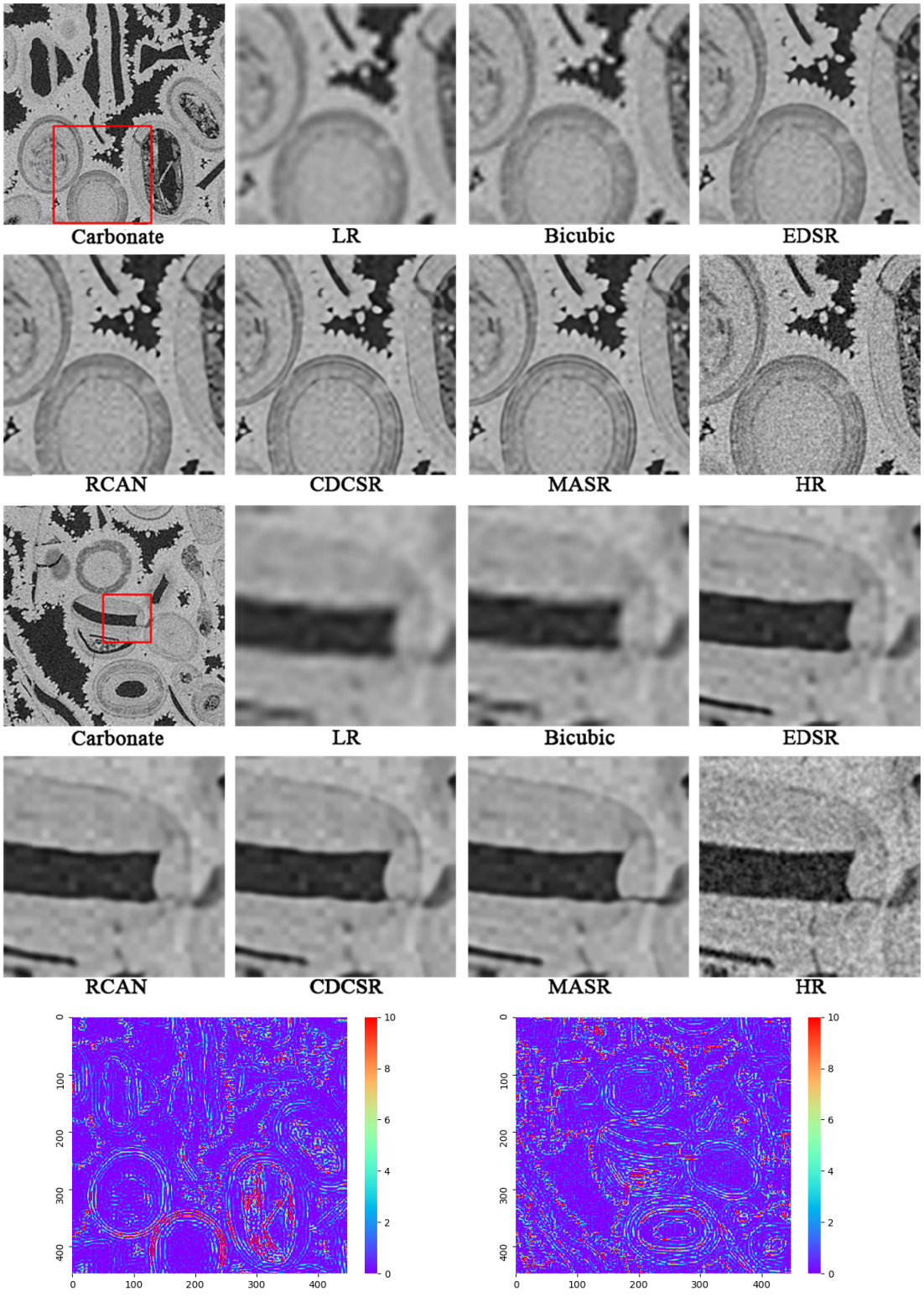

Figure S9. T Additional qualitative comparison of our model with other works at ×4 SR on the carbonate test set. Bottom: Difference maps of MASR and RCAN SR results in the above two sets of images (MASR minus RCAN). The difference maps show that the edge recovered by MASR is sharper.