Skill of South Asian Precipitation Forecasts in Multiple Seasonal Prediction Systems: Supplementary Information

Asia Regional Resilience to a Changing Climate (ARRCC)

Work Package 2: Strengthening Climate Information Partnerships – South Asia (SCIPSA)

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Supplementary information

Contents

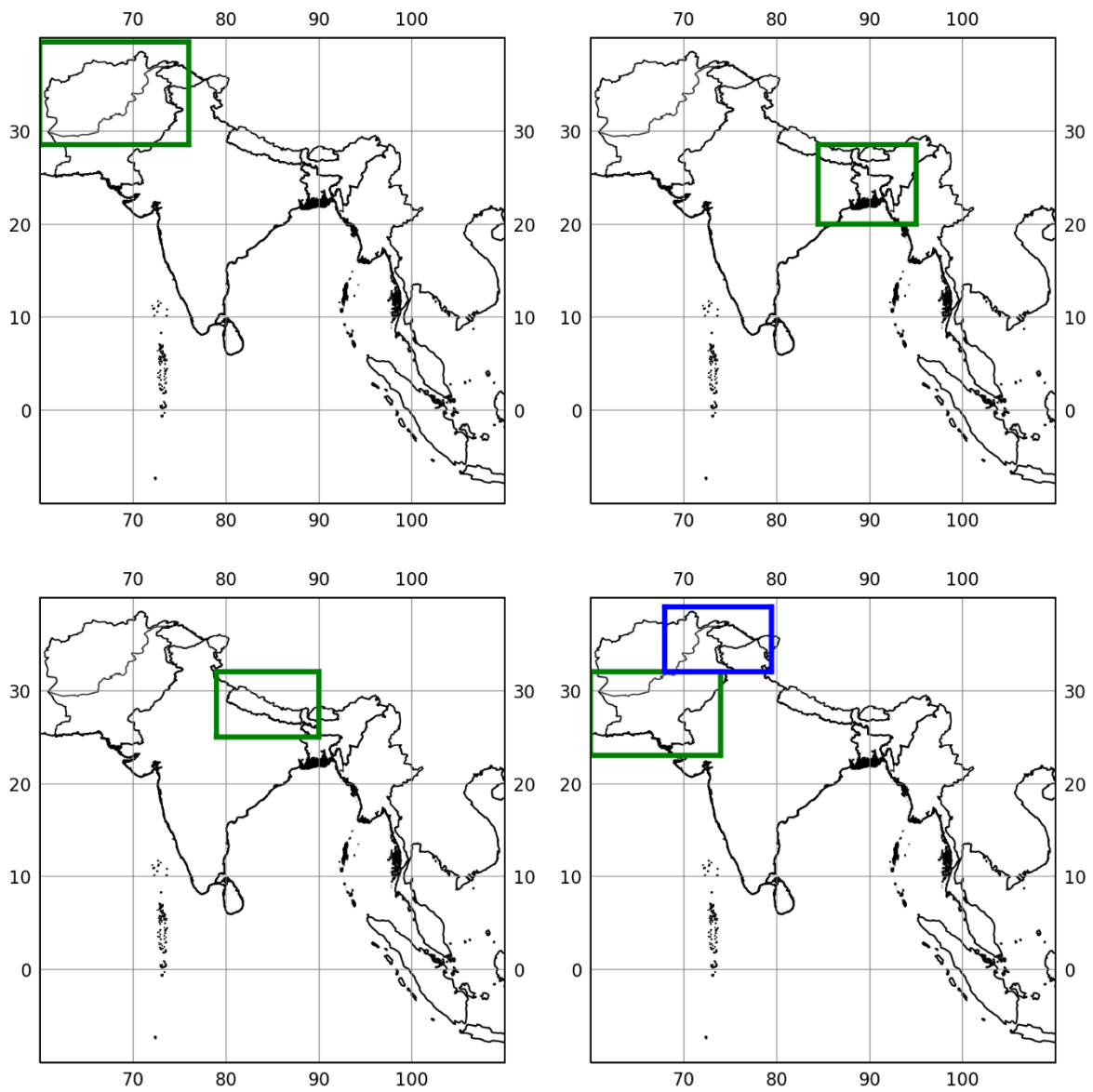# Appendix 1 – Rectangular domain boxes used for each ARRCC focal country

Figure A1: Visual outline of domain boxes for Afghanistan (top left panel), Bangladesh (top right panel), Nepal (bottom left panel) and Pakistan (bottom right panel) South (green box) / North (blue box)

Appendix 2 – Spatial ROC skill for the near-normal tercile for JJAS
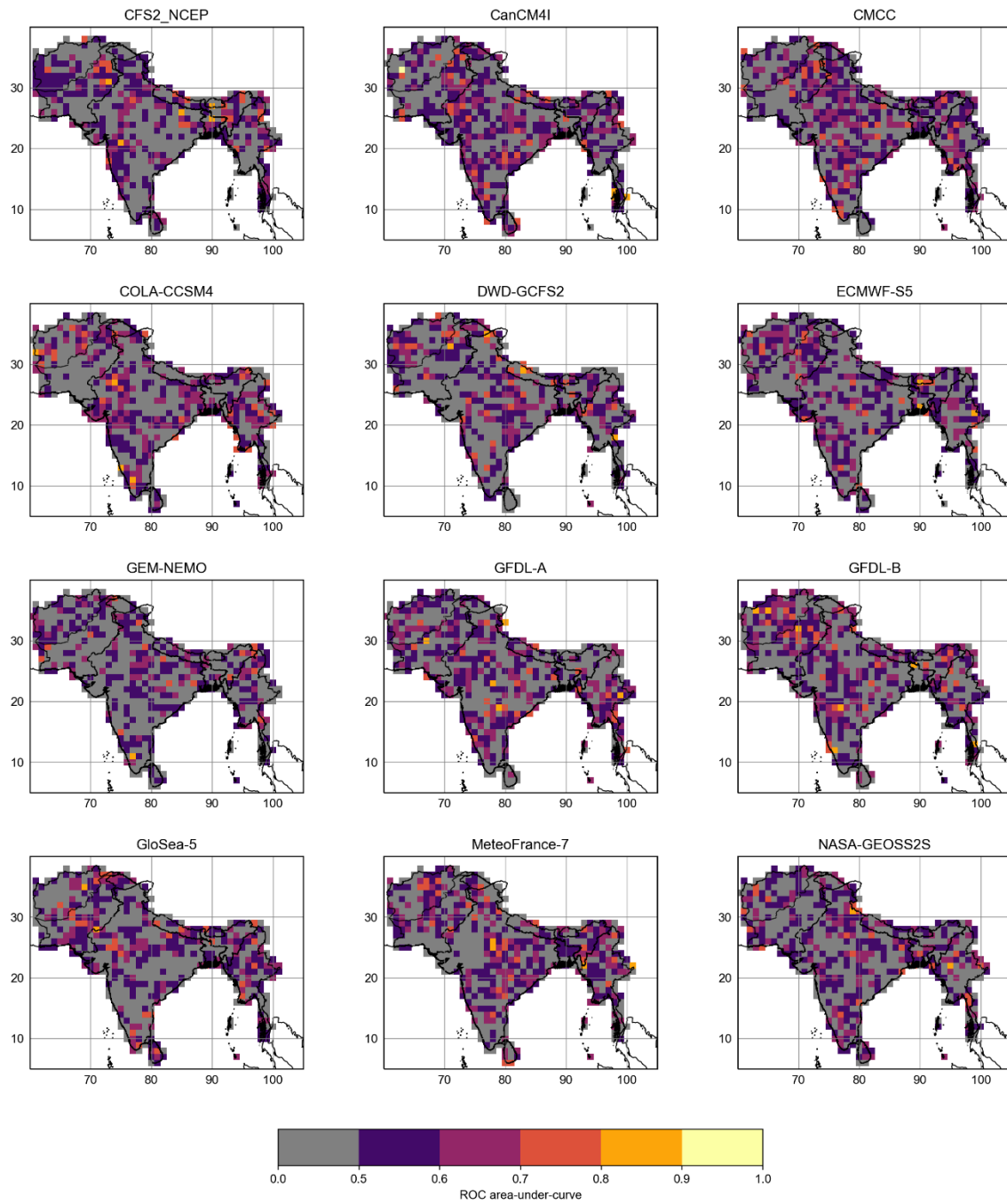

Figure A2: Maps showing the area under the ROC curve for the near-normal tercile for each mode for JJAS precipitation. Values greater than 0.5 indicate a skilful forecast.

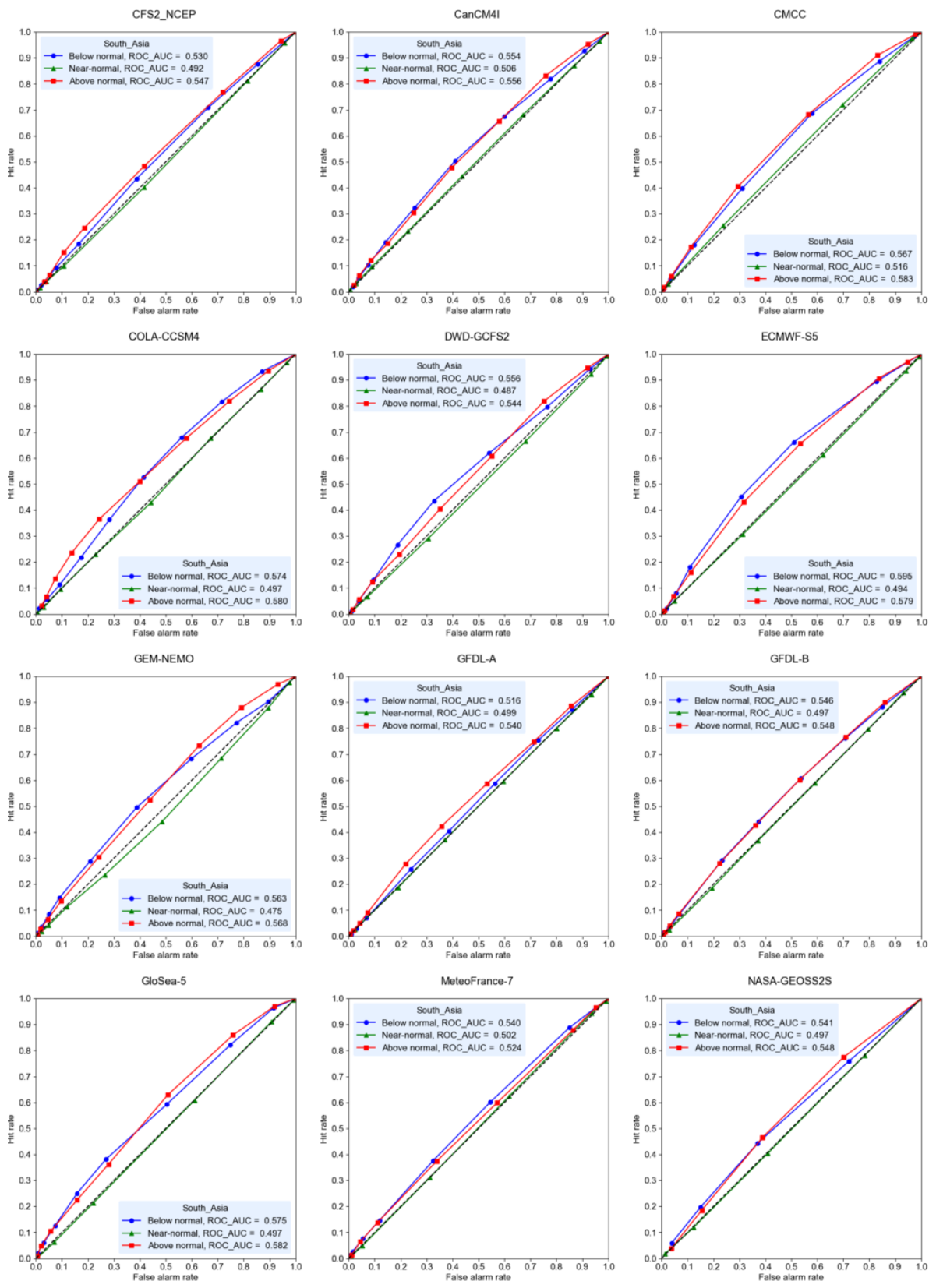# Appendix 3 – South Asia domain: ROC and reliability plots for JJAS

Figure A3-i: ROC curves for hindcasts of JJAS total precipitation for 1993-2016 from each of the models over South Asia
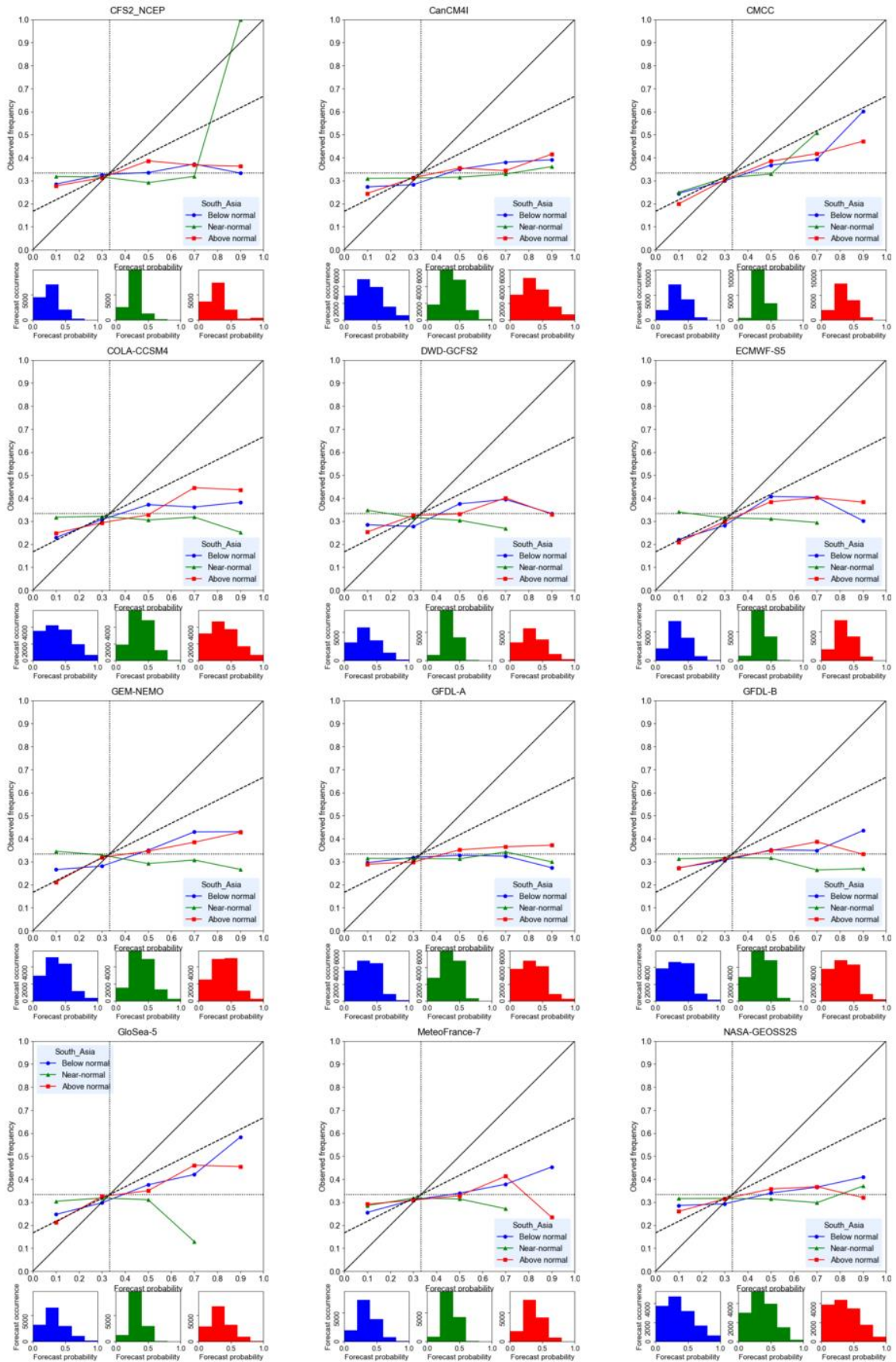
Figure A3-ii: Reliability diagrams for hindcasts of JJAS total precipitation for 1993-2016 from each of the models over South Asia

Appendix 4 – Afghanistan domain: ROC and reliability plots for JJAS
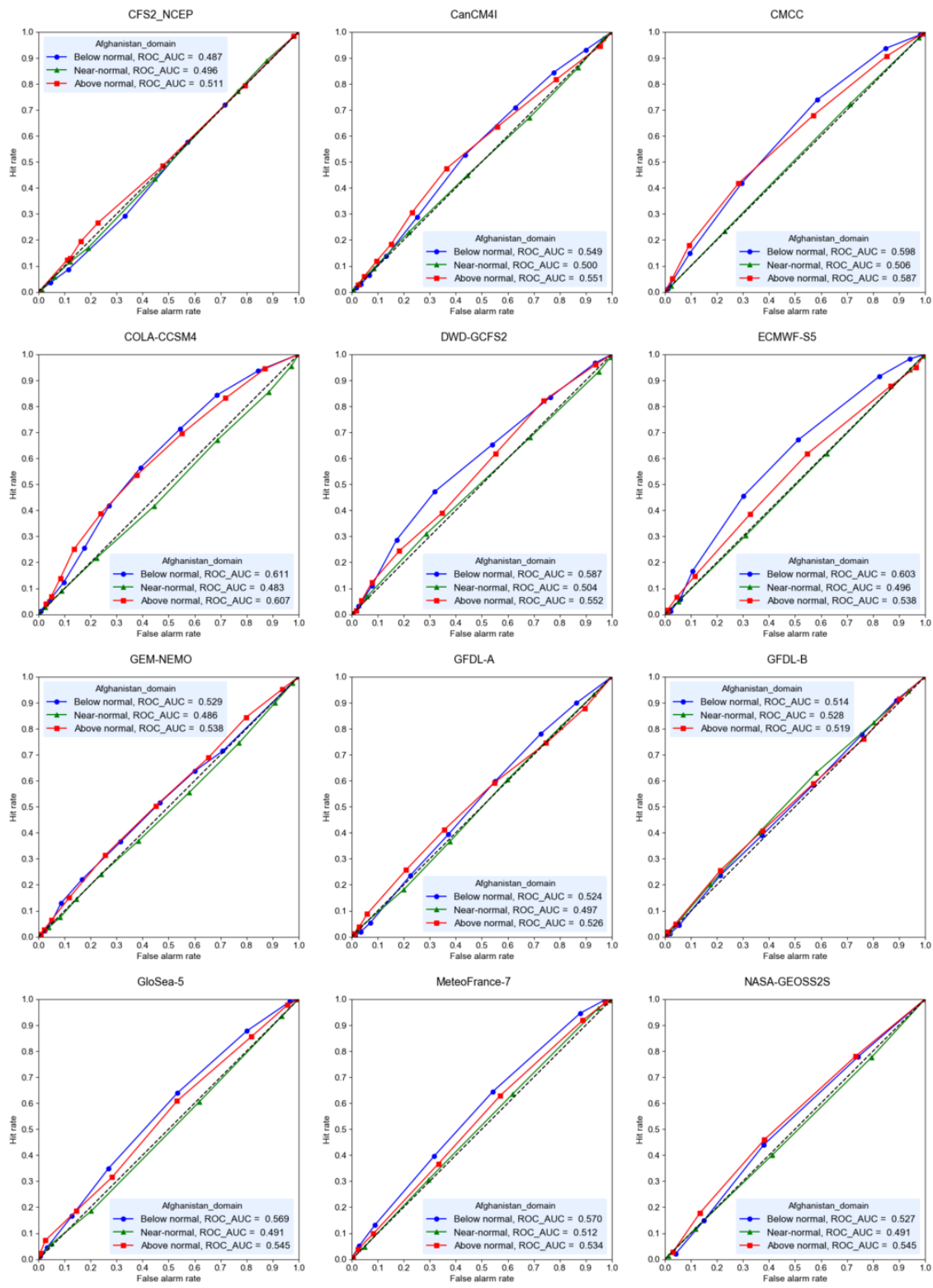

Figure A4-i: ROC curves for hindcasts of JJAS total precipitation for 1993-2016 from each of the models over the Afghanistan domain
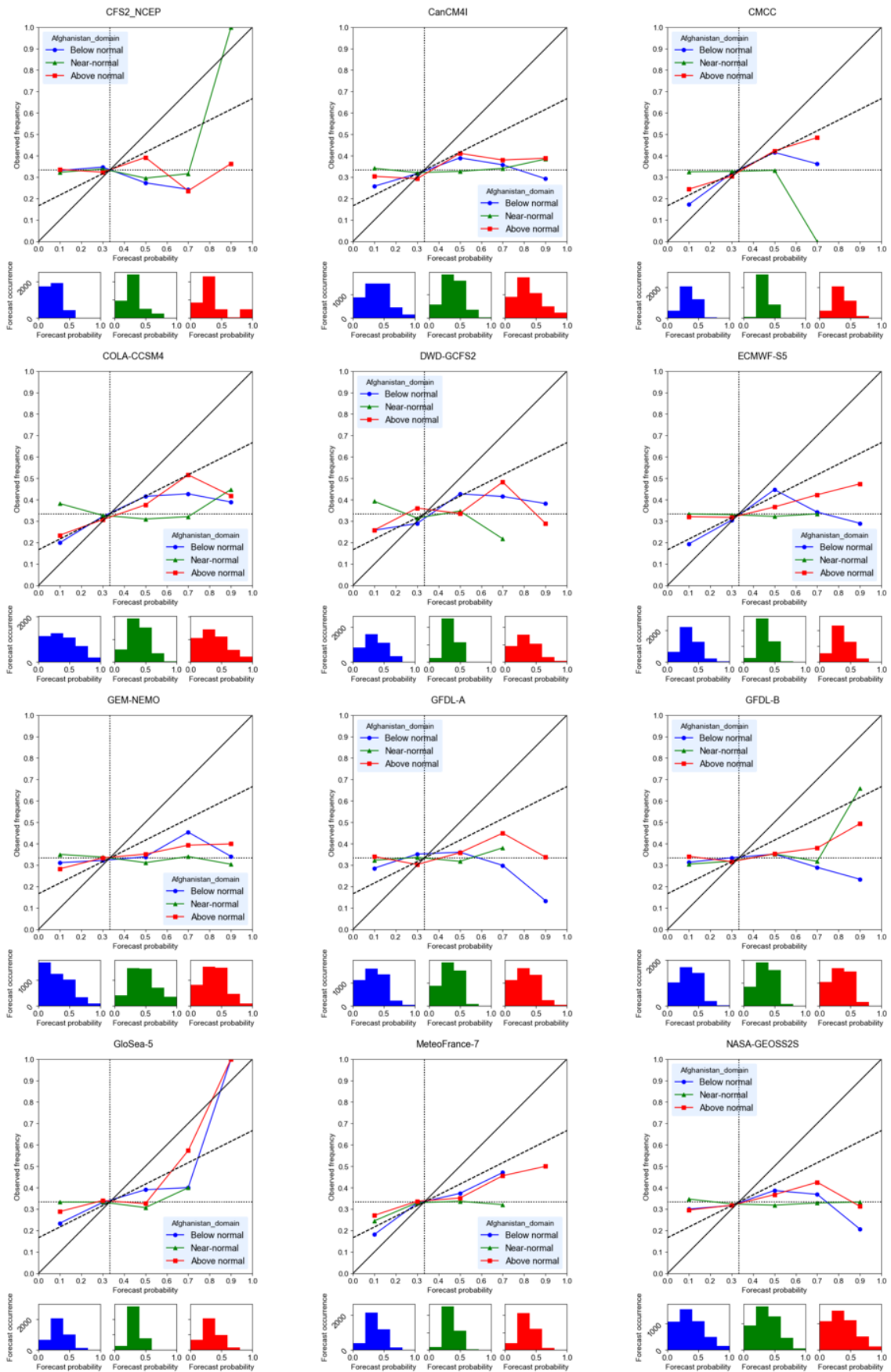
Figure A4-ii: Reliability diagram for hindcasts of JJAS total precipitation for 1993-2016 from each of the models over the Afghanistan domain

Appendix 5 – Bangladesh domain: ROC and reliability plots for JJAS
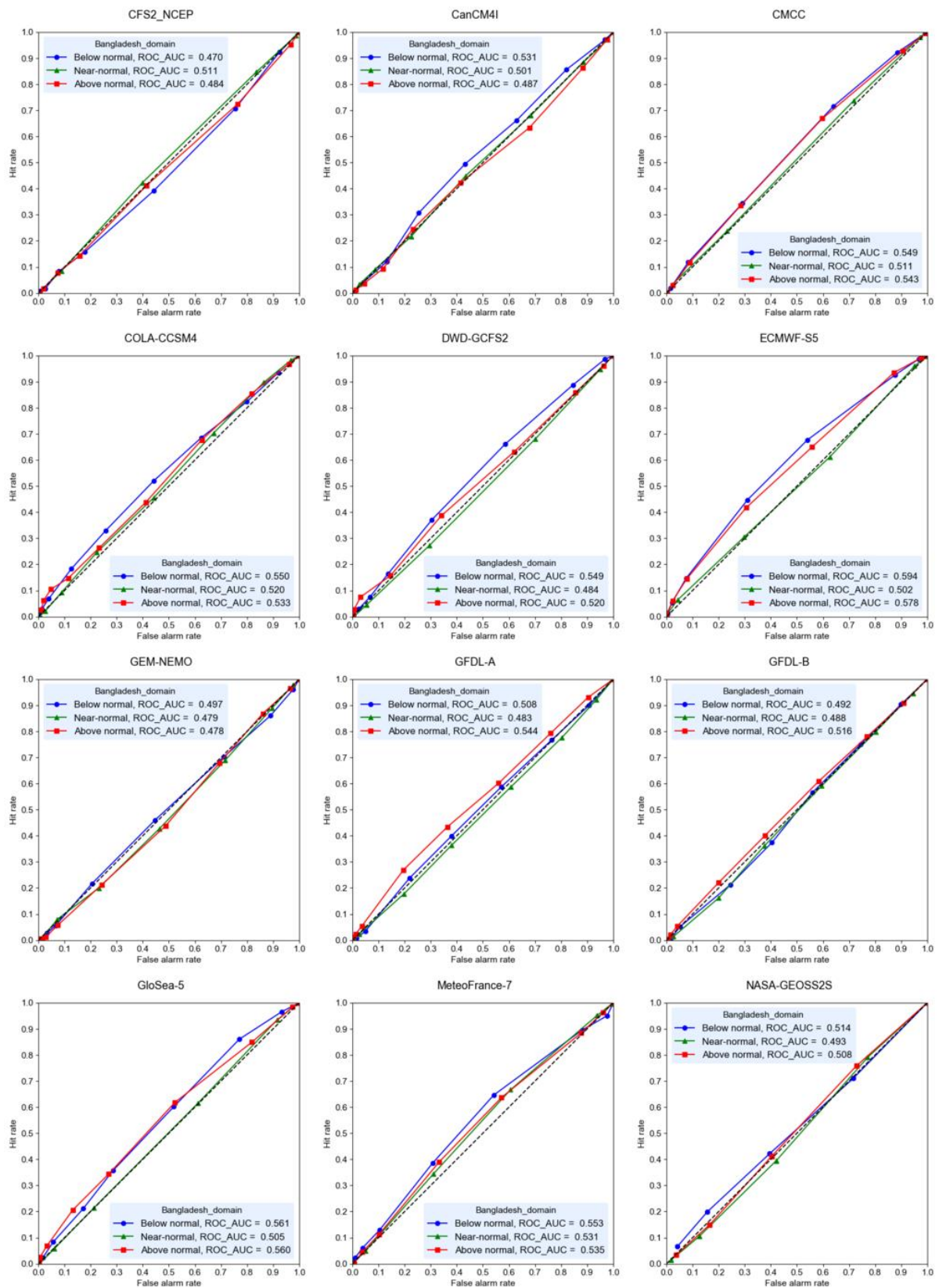

Figure A5-i: ROC curves for hindcasts of JJAS total precipitation for 1993-2016 from each of the models over the Bangladesh domain
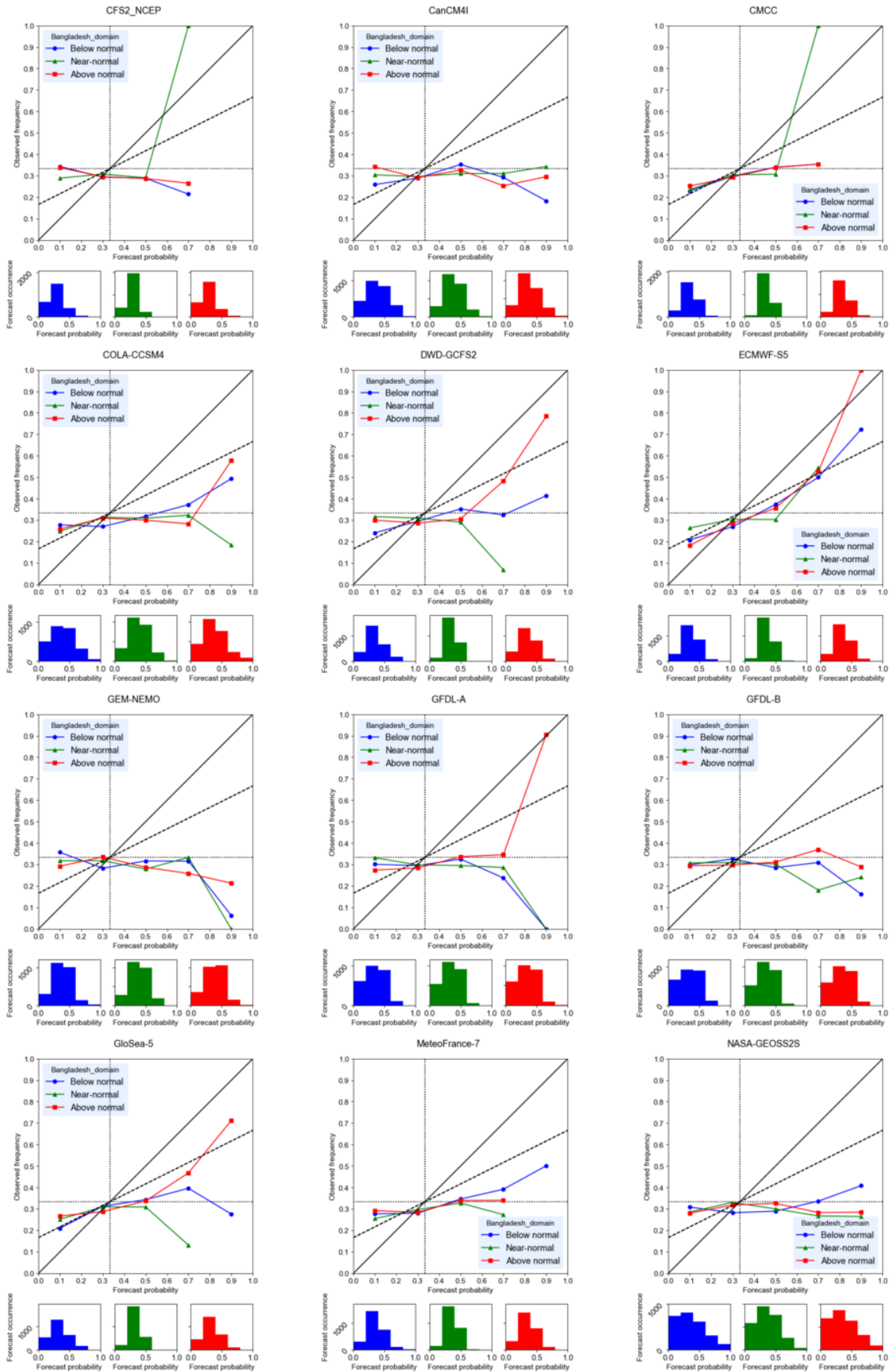
Figure A5-ii: Reliability diagram for hindcasts of JJAS total precipitation for 1993-2016 from each of the models over the Bangladesh domain

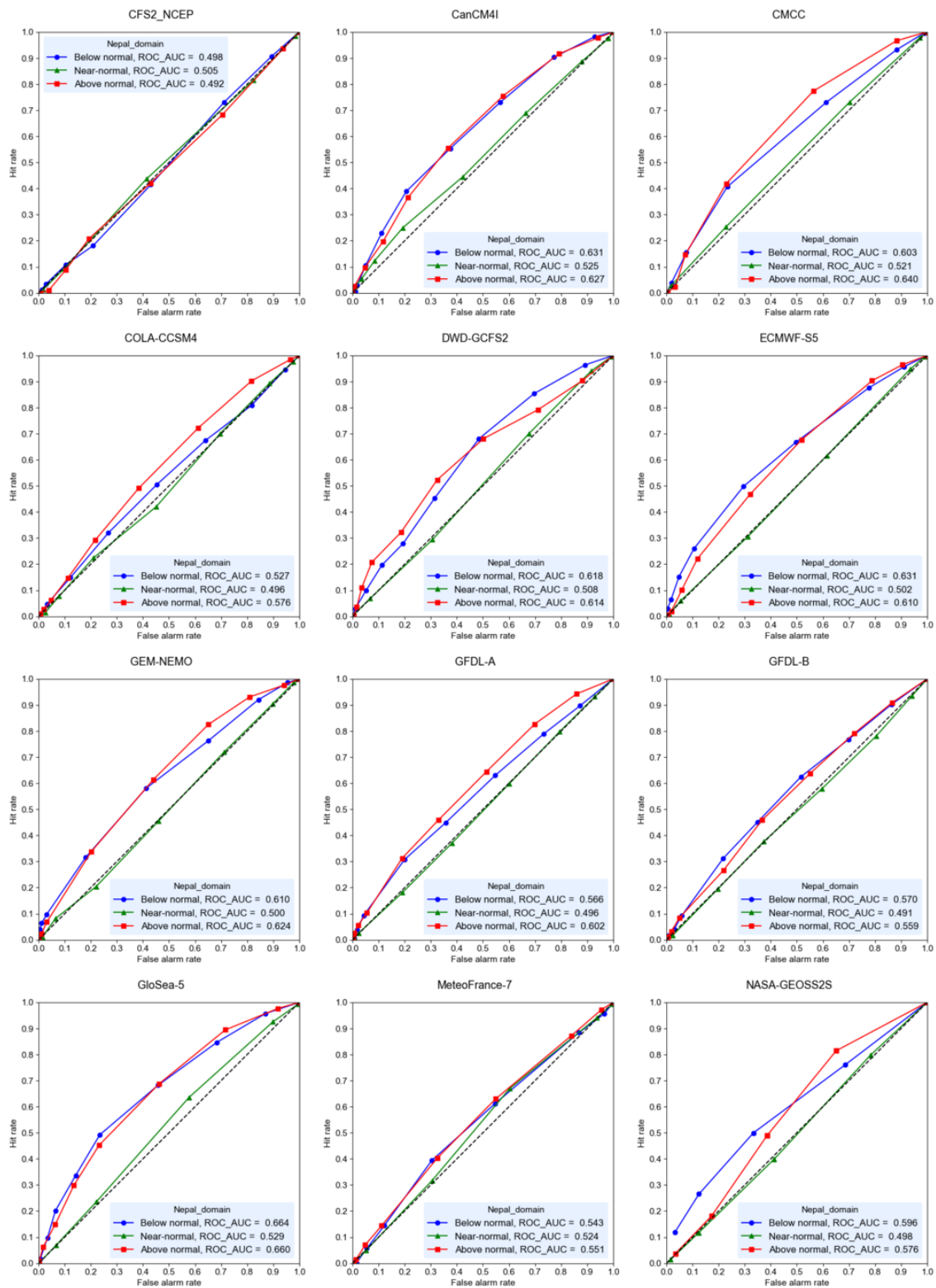# Appendix 6 – Nepal domain: ROC and reliability plots for JJAS

Figure A6-i: ROC curves for hindcasts of JJAS total precipitation for 1993-2016 from each of the models over the Nepal domain
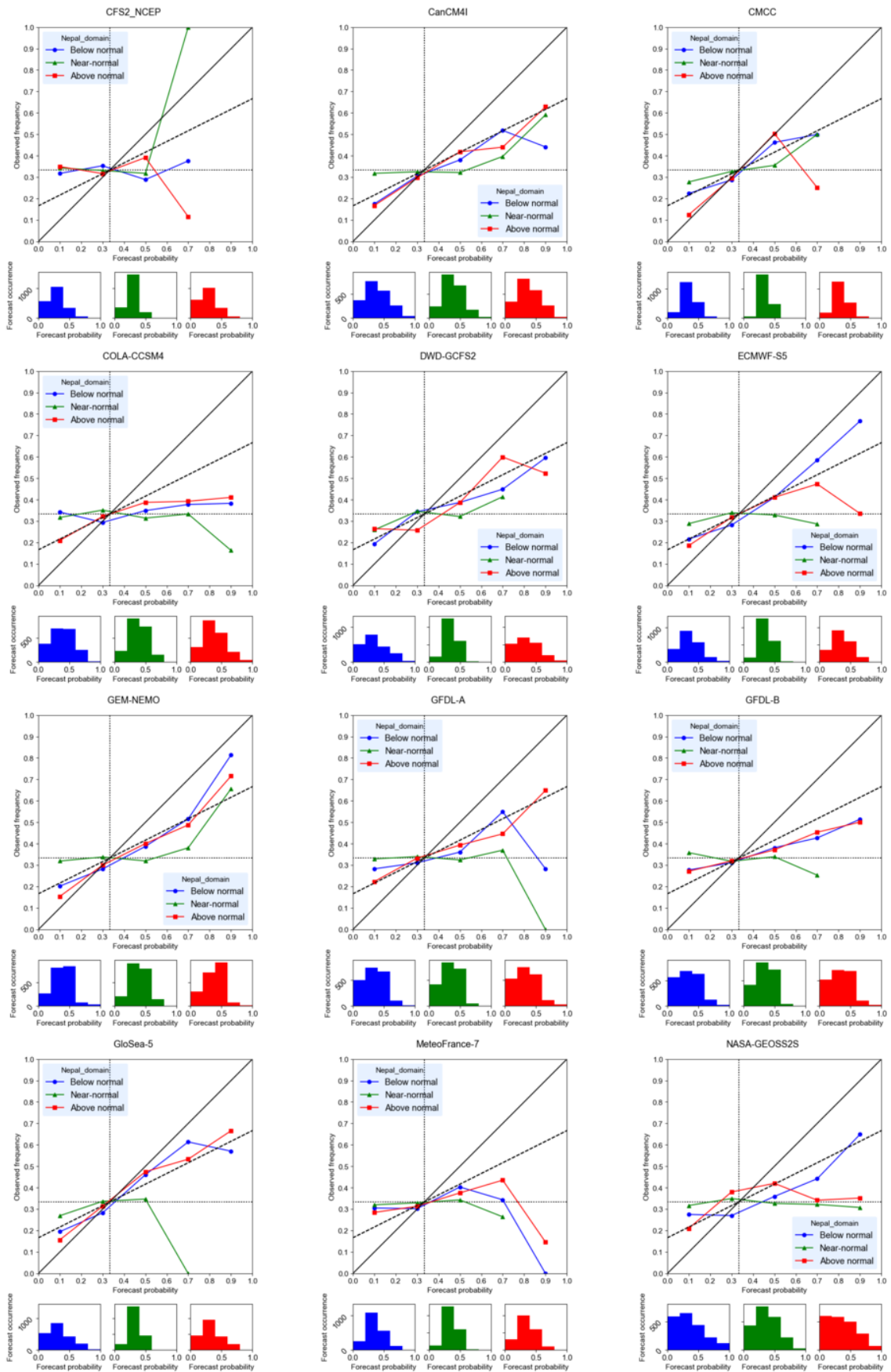
Figure A6-ii: Reliability diagrams for hindcasts of JJAS total precipitation for 1993-2016 from each of the models over the Nepal domain

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Figure A7-ii: Reliability diagrams for hindcasts of JJAS total precipitation for 1993-2016 from each of the models over the Pakistan North domain

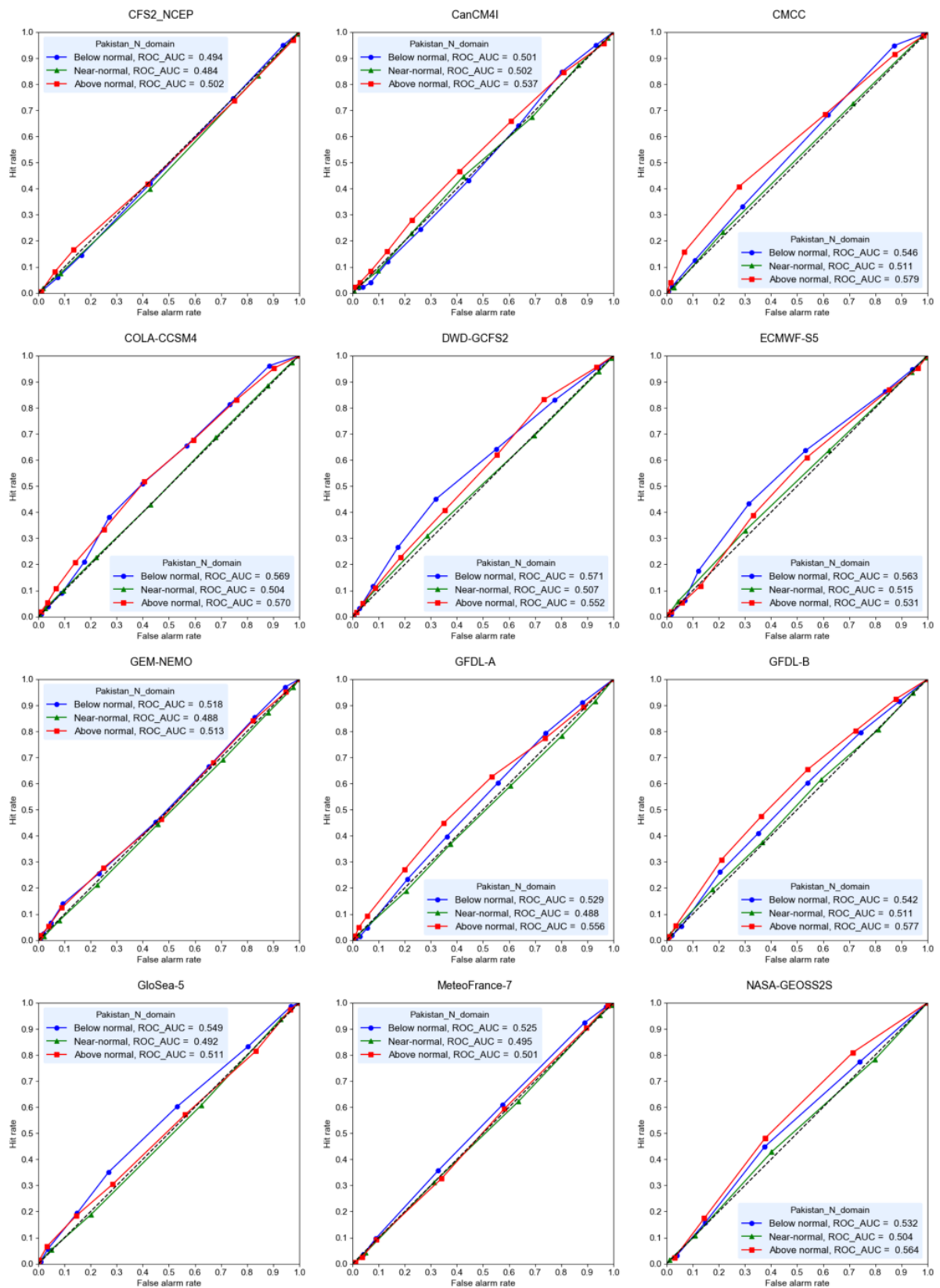# Appendix 8 – Pakistan South domain: ROC and reliability plots for JJAS

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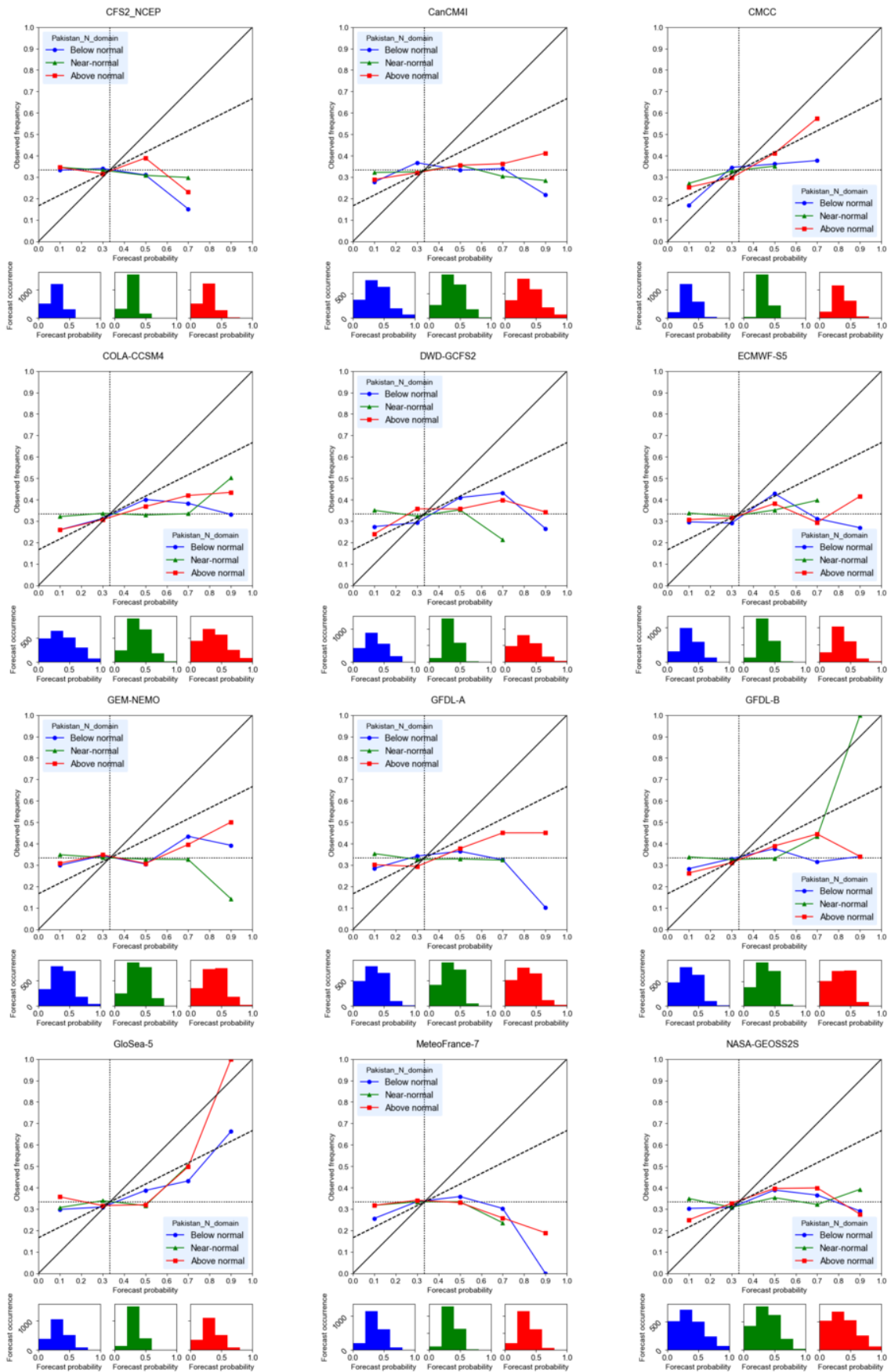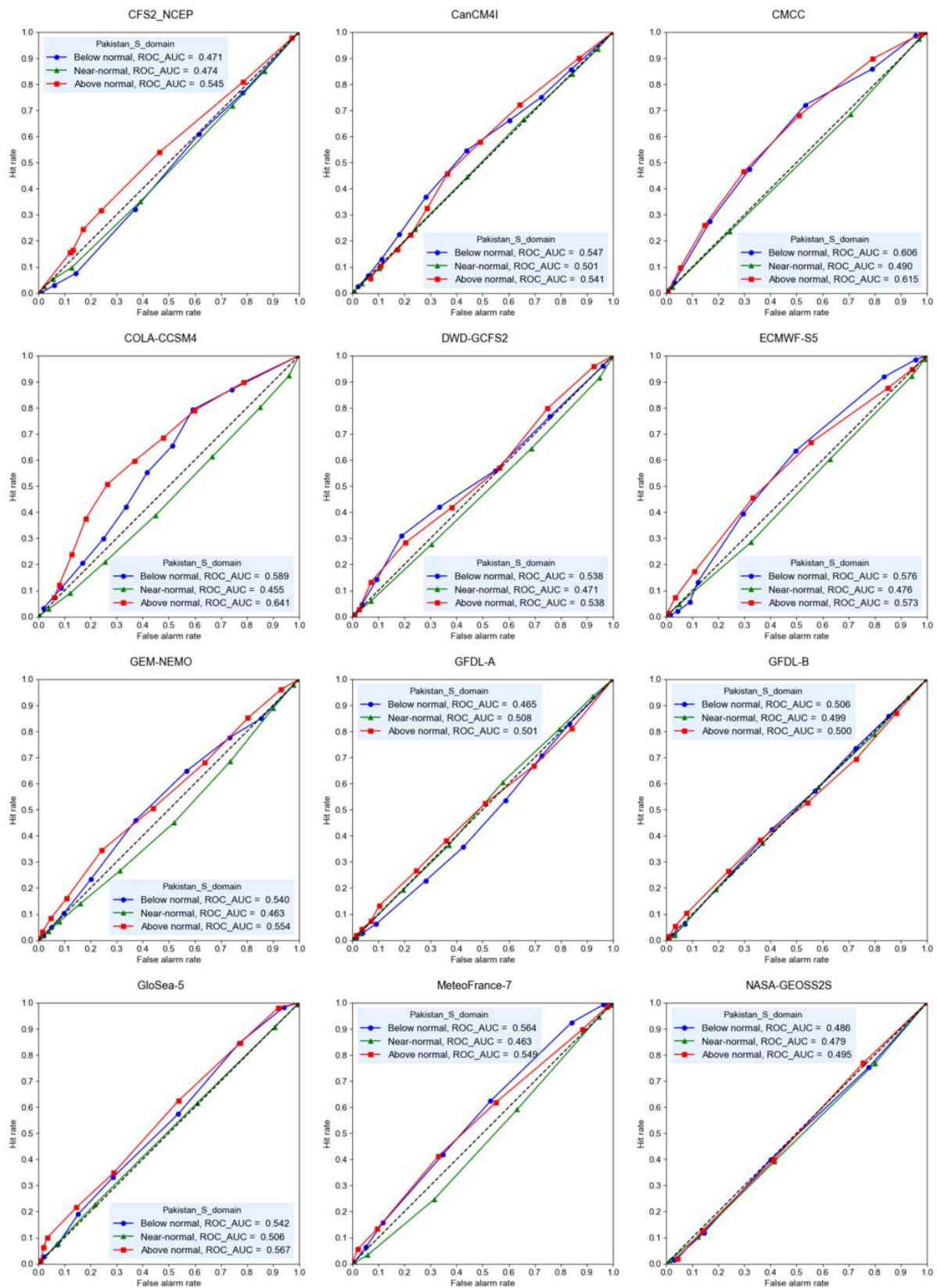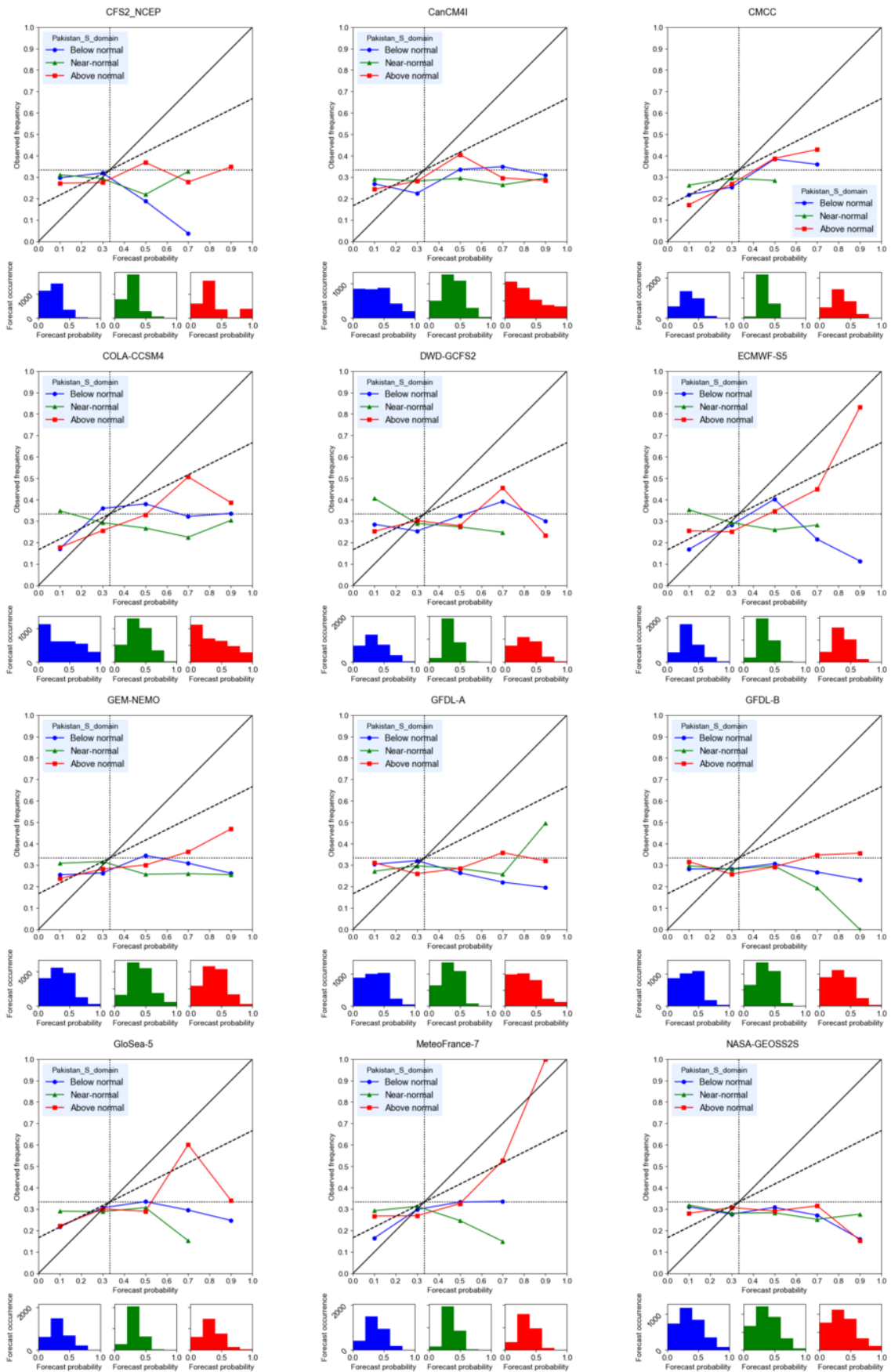
Figure A8-ii: Reliability diagrams for hindcasts of JJAS total precipitation for 1993-2016 from each of the models over the Pakistan South domain

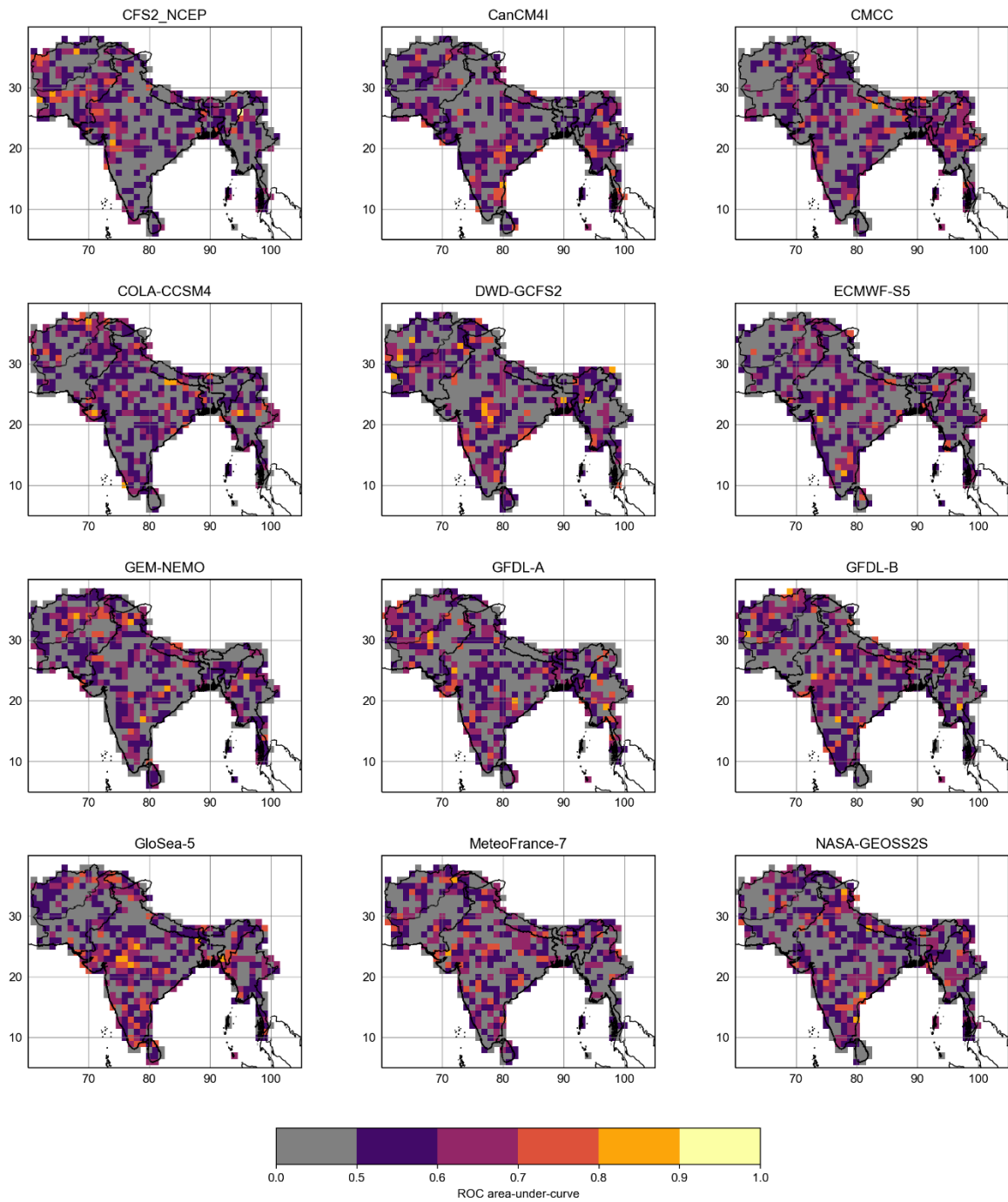# Appendix 9 – Spatial ROC skill for the near-normal tercile for OND

Figure A9: Maps showing the area under the ROC curve for the near-normal tercile for each model for OND precipitation. Values greater than 0.5 indicate a skilful forecast.

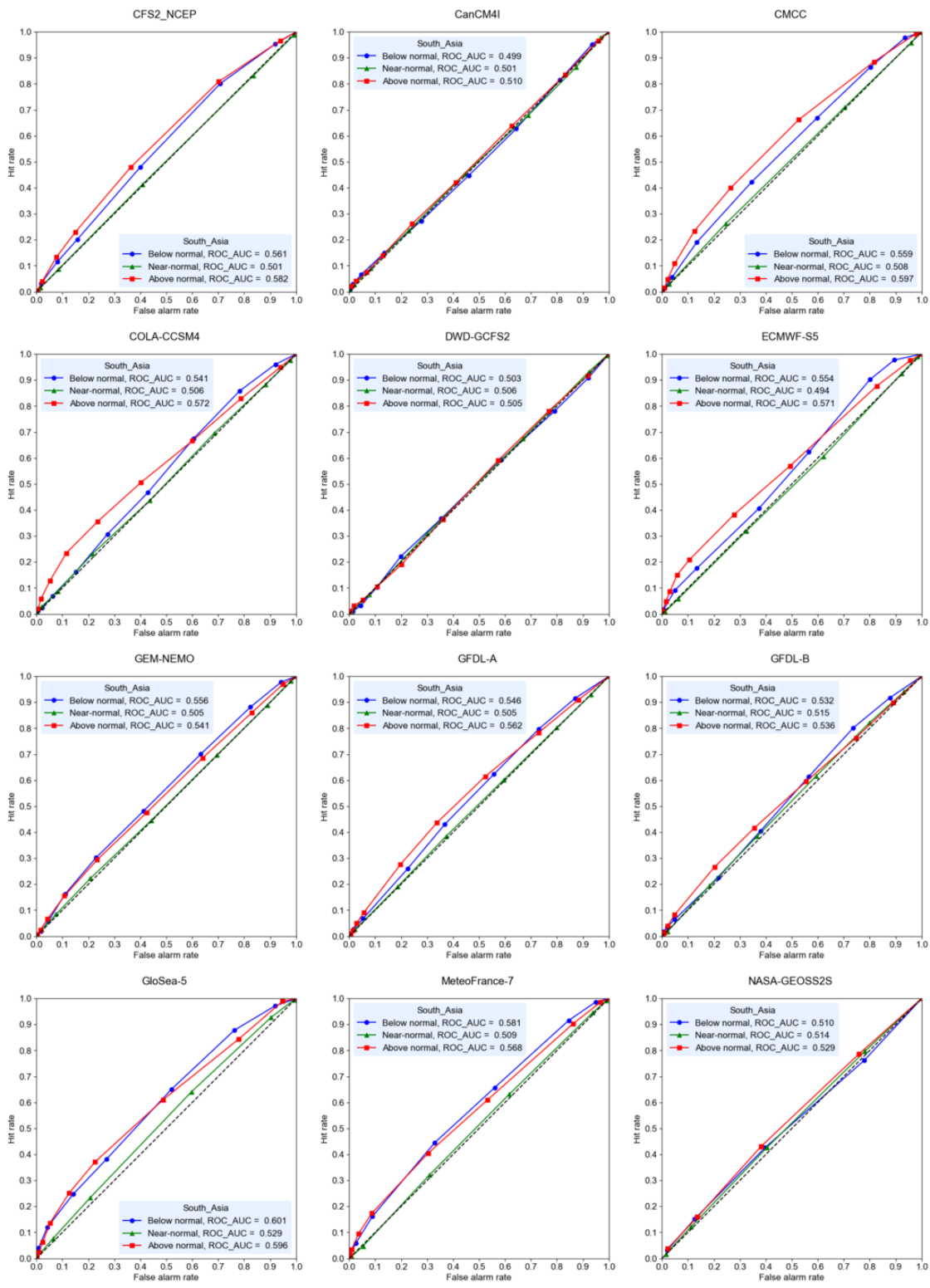# Appendix 10 – South Asia domain: ROC and reliability plots for OND

Figure A10-i: ROC curves for hindcasts of OND total precipitation for 1993-2016 from each of the models over South Asia
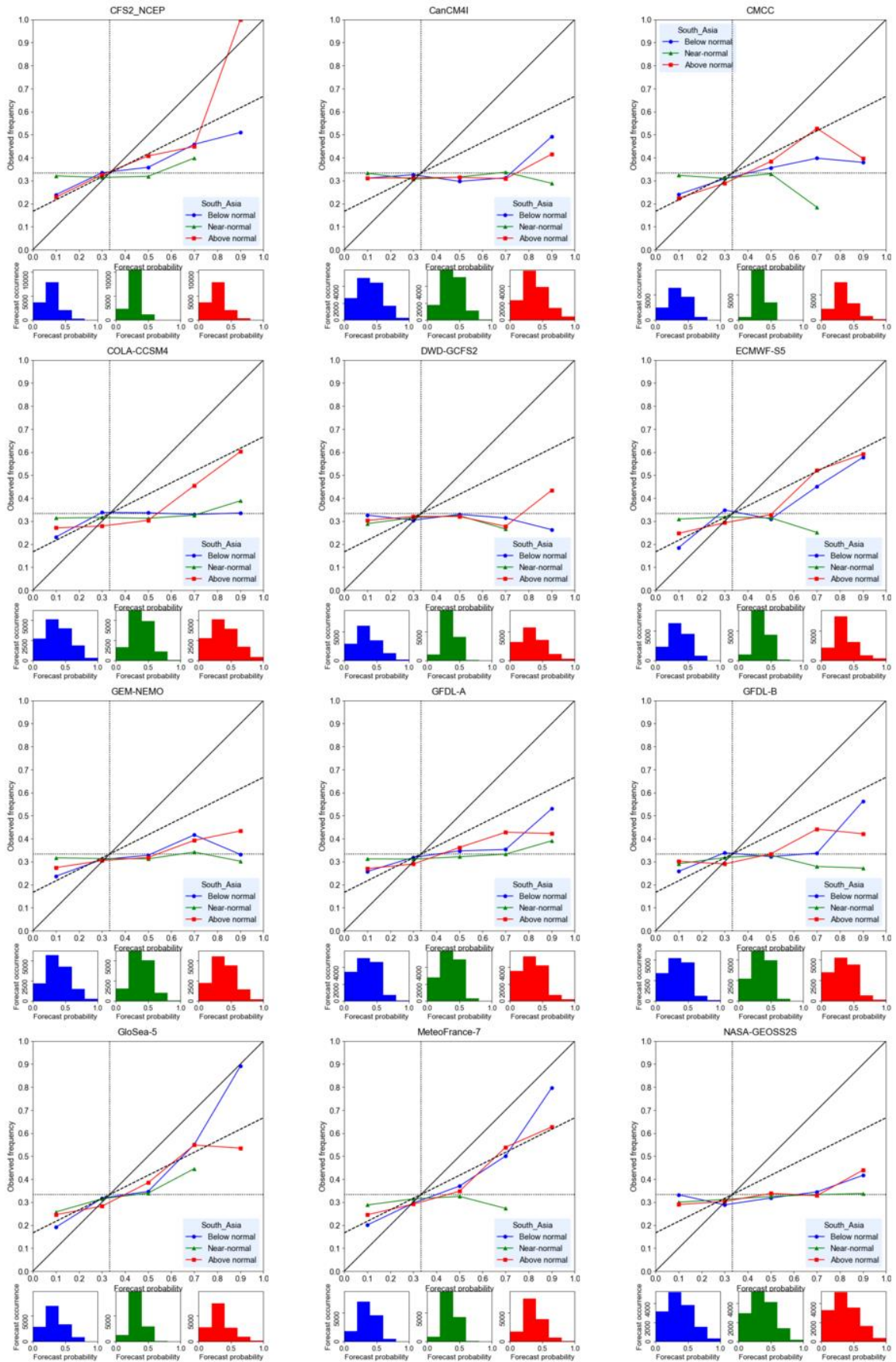
Figure A10-ii: Reliability diagrams for hindcasts of OND total precipitation for 1993-2016 from each of the models over South Asia

Appendix 11 – Afghanistan domain: ROC and reliability plots for OND
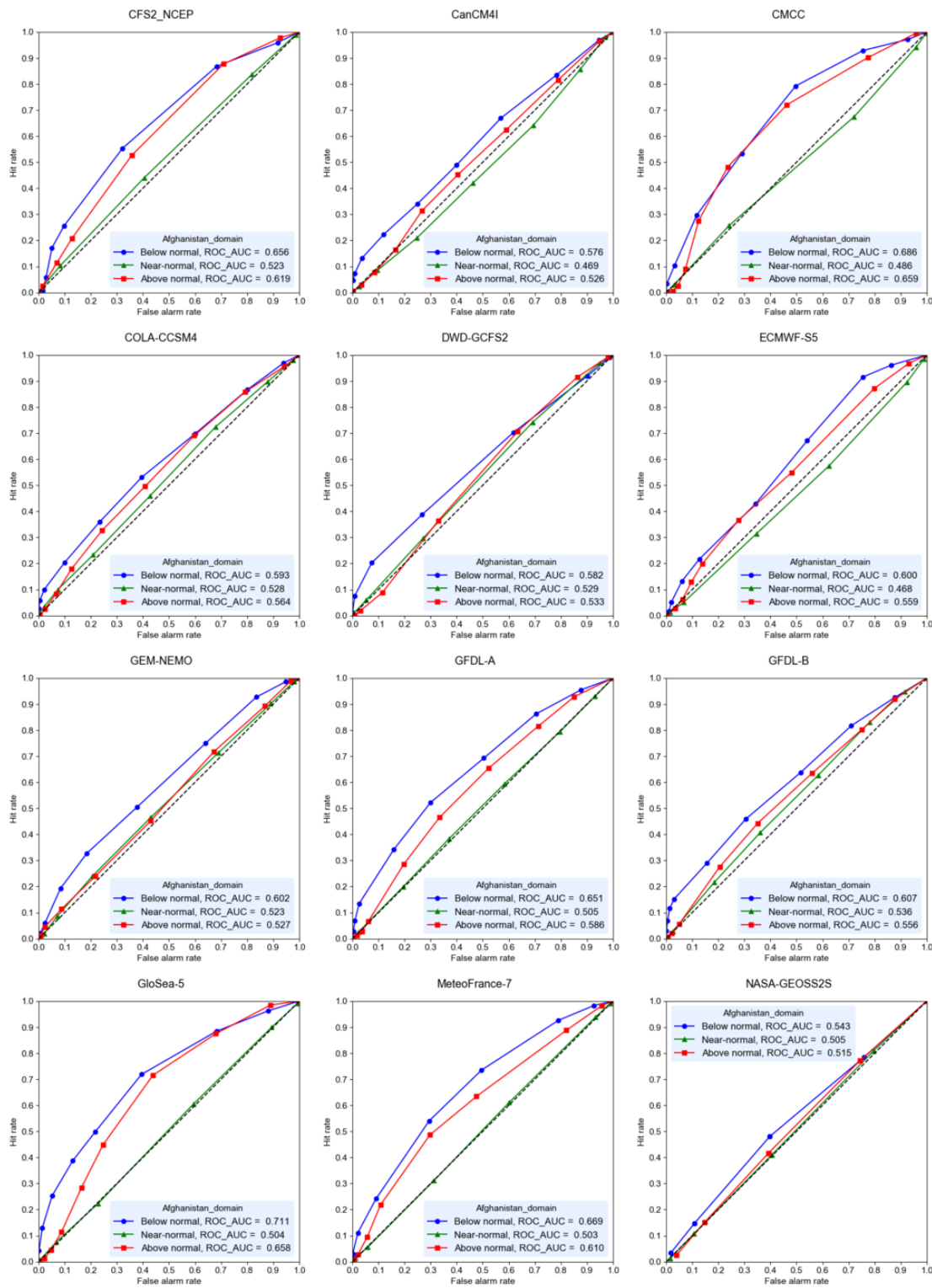

Figure A11-i: ROC curves for hindcasts of OND total precipitation for 1993-2016 from each of the models over the Afghanistan domain
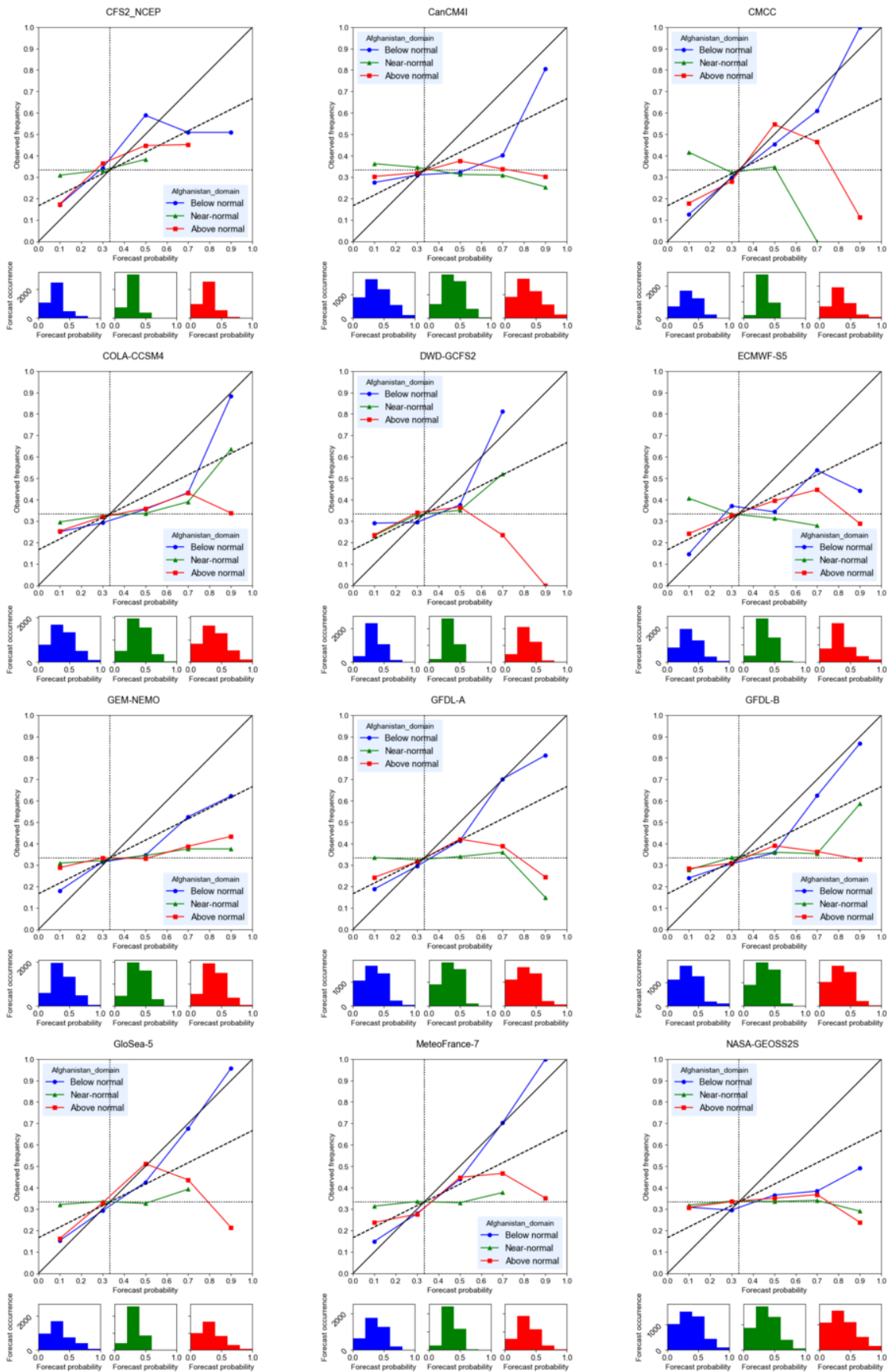
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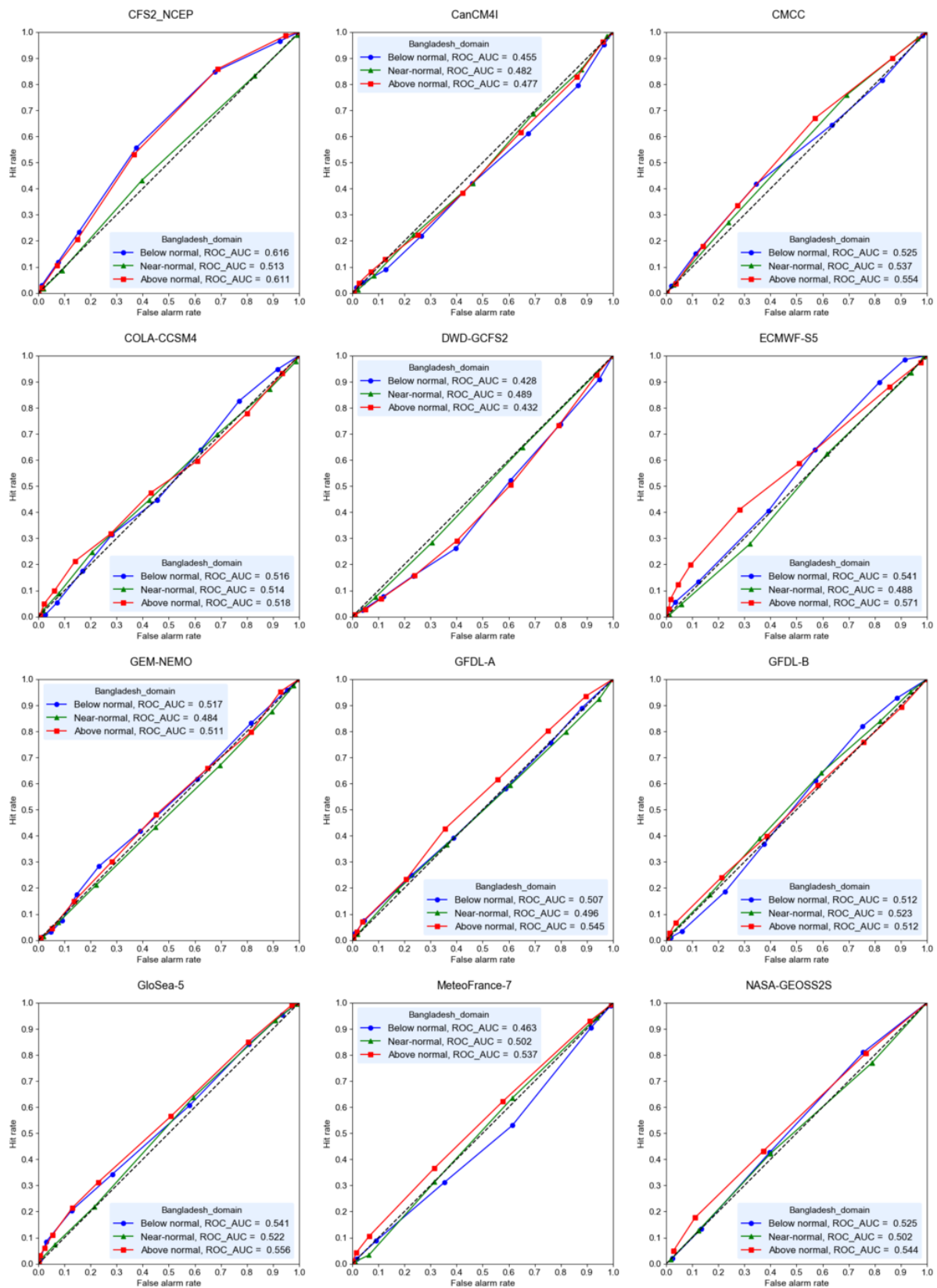

Figure A12-i: ROC curves for hindcasts of OND total precipitation for 1993-2016 from each of the models over the Bangladesh domain

Figure A12-ii: Reliability diagrams for hindcasts of OND total precipitation for 1993-2016 from each of the models over the Bangladesh domain

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Figure A13-i: ROC curves for hindcasts of OND total precipitation for 1993-2016 from each of the models over the Nepal domain
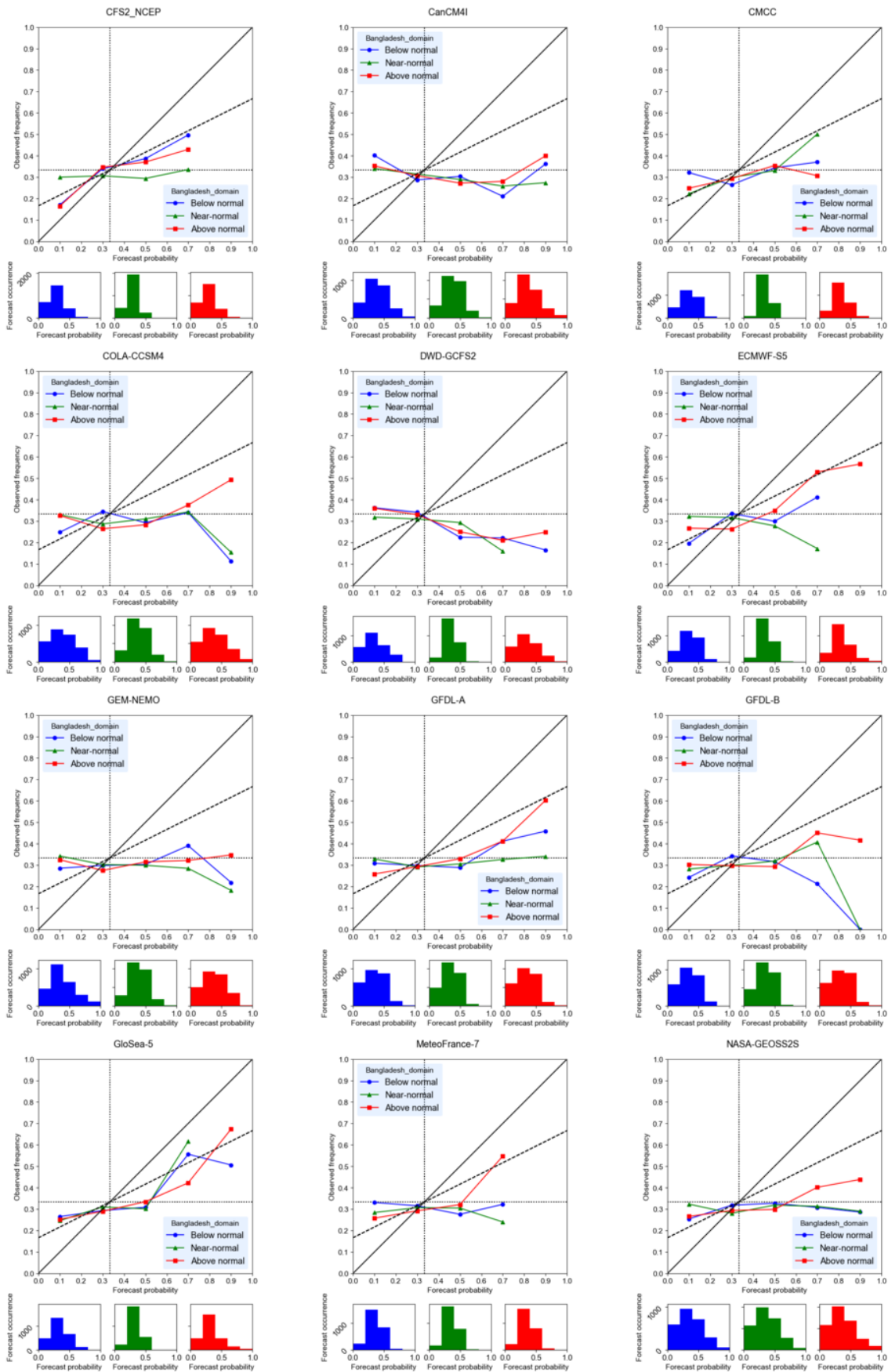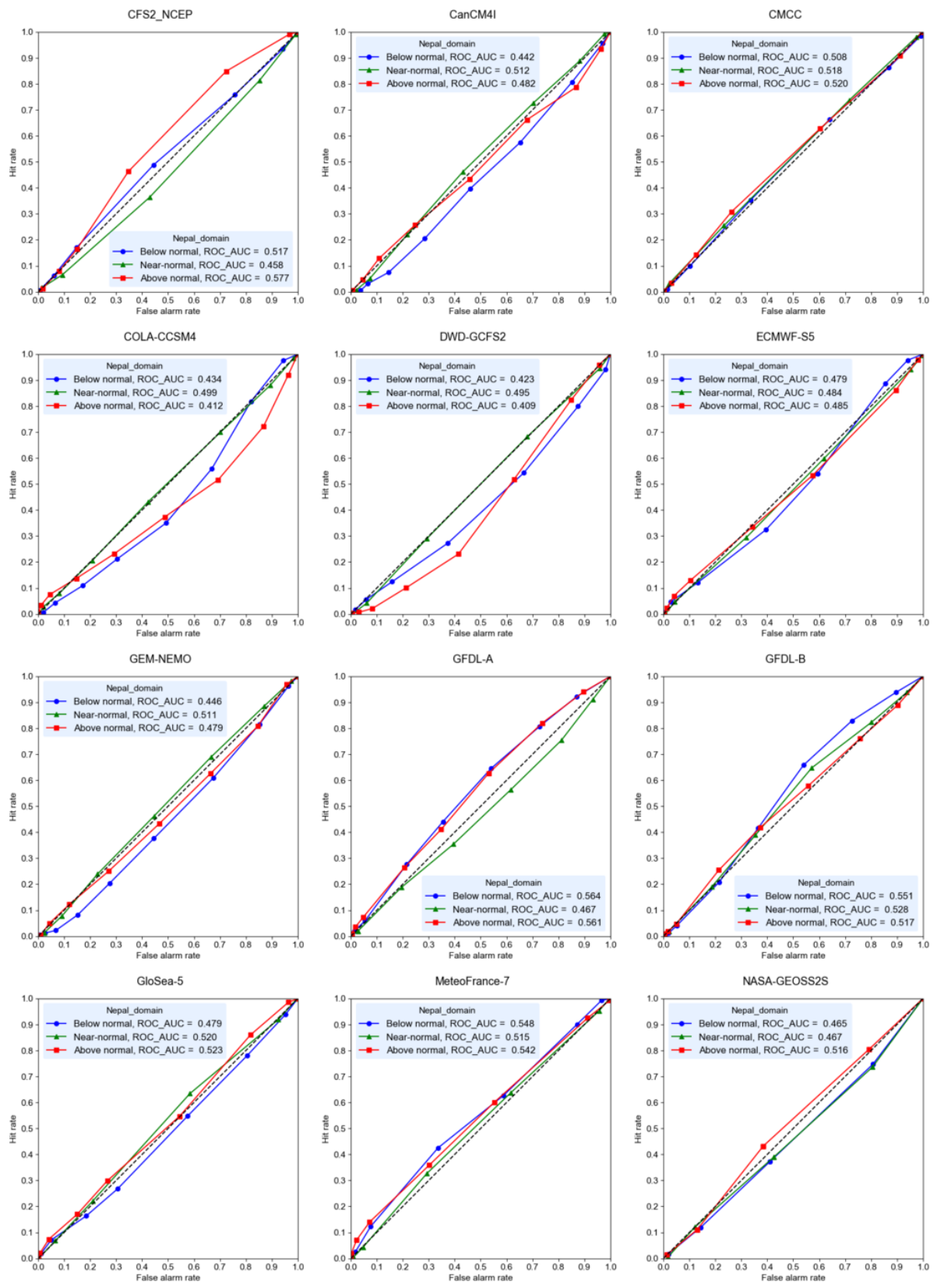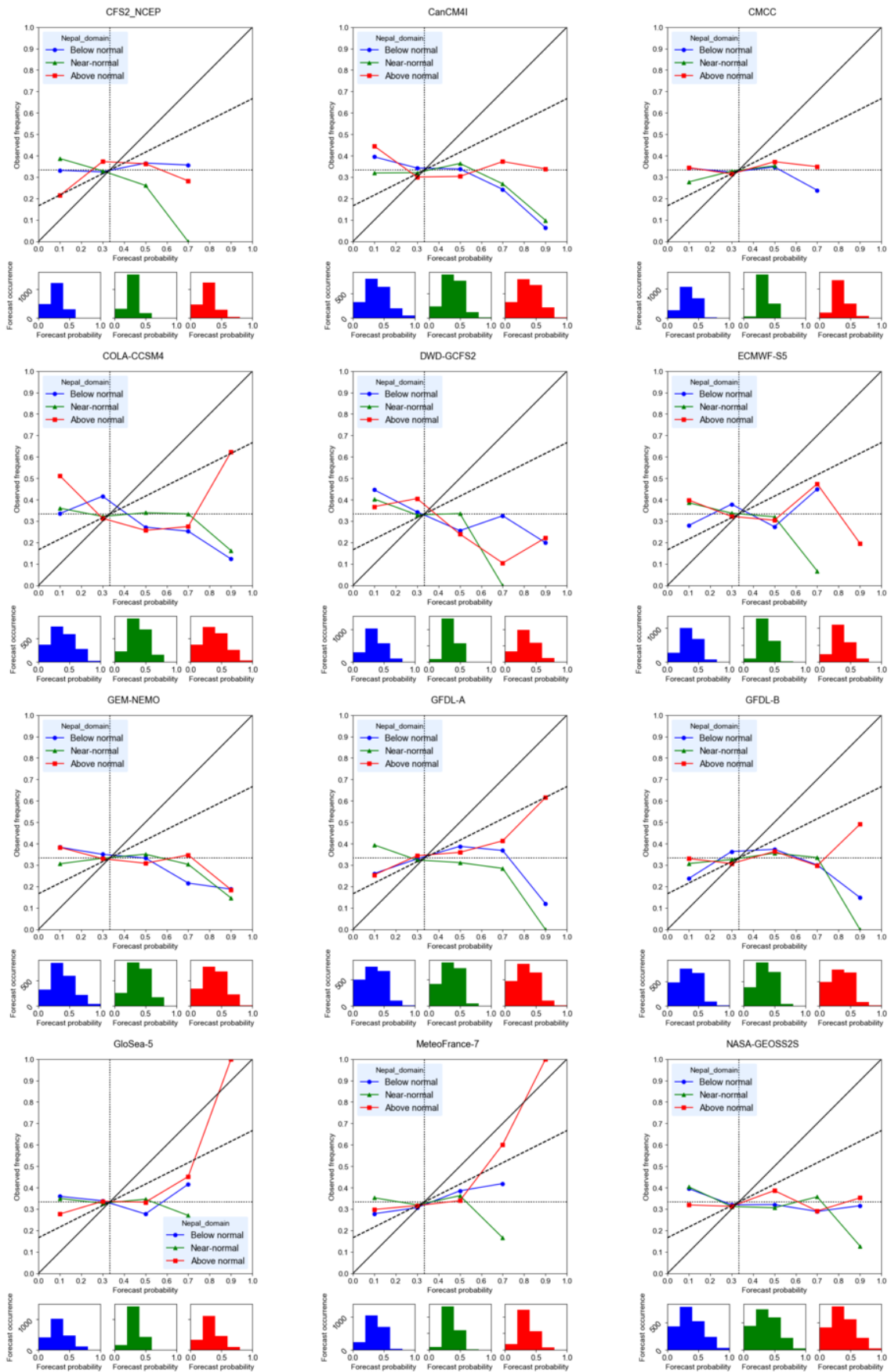
Figure A13-ii: Reliability diagrams for hindcasts of OND total precipitation for 1993-2016 from each of the models over the Nepal domain

Appendix 14 – Pakistan North domain: ROC and reliability plots for OND

Figure A14-i: ROC curves for hindcasts of OND total precipitation for 1993-2016 from each of the models over the Pakistan North domain

Figure A14-ii: Reliability diagrams for hindcasts of OND total precipitation for 1993-2016 from each of the models over the Pakistan North domain

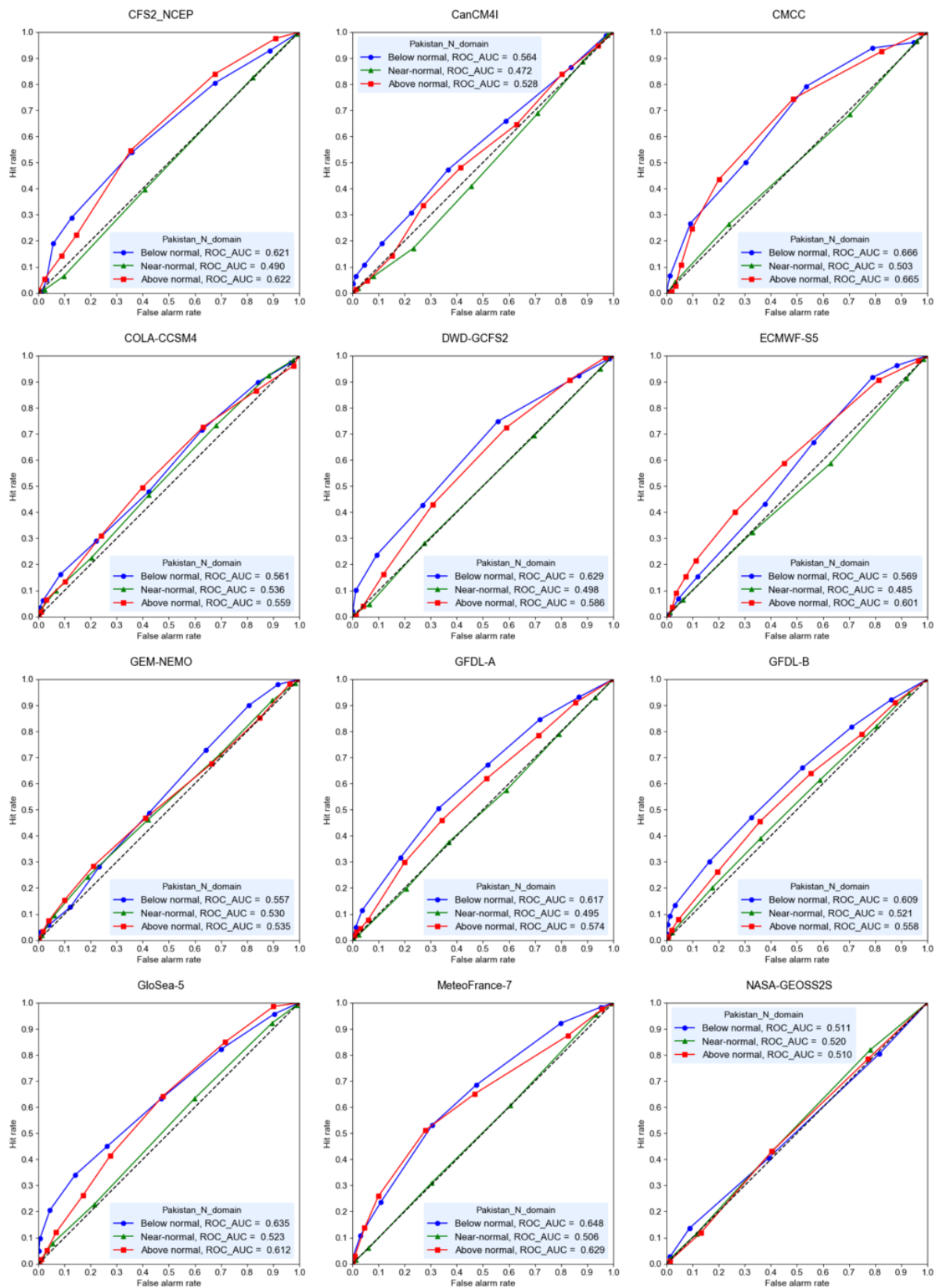# Appendix 15 – Pakistan South domain: ROC and reliability plots for OND

Figure A15-i: ROC curves for hindcasts of OND total precipitation for 1993-2016 from each of the models over the Pakistan South domain
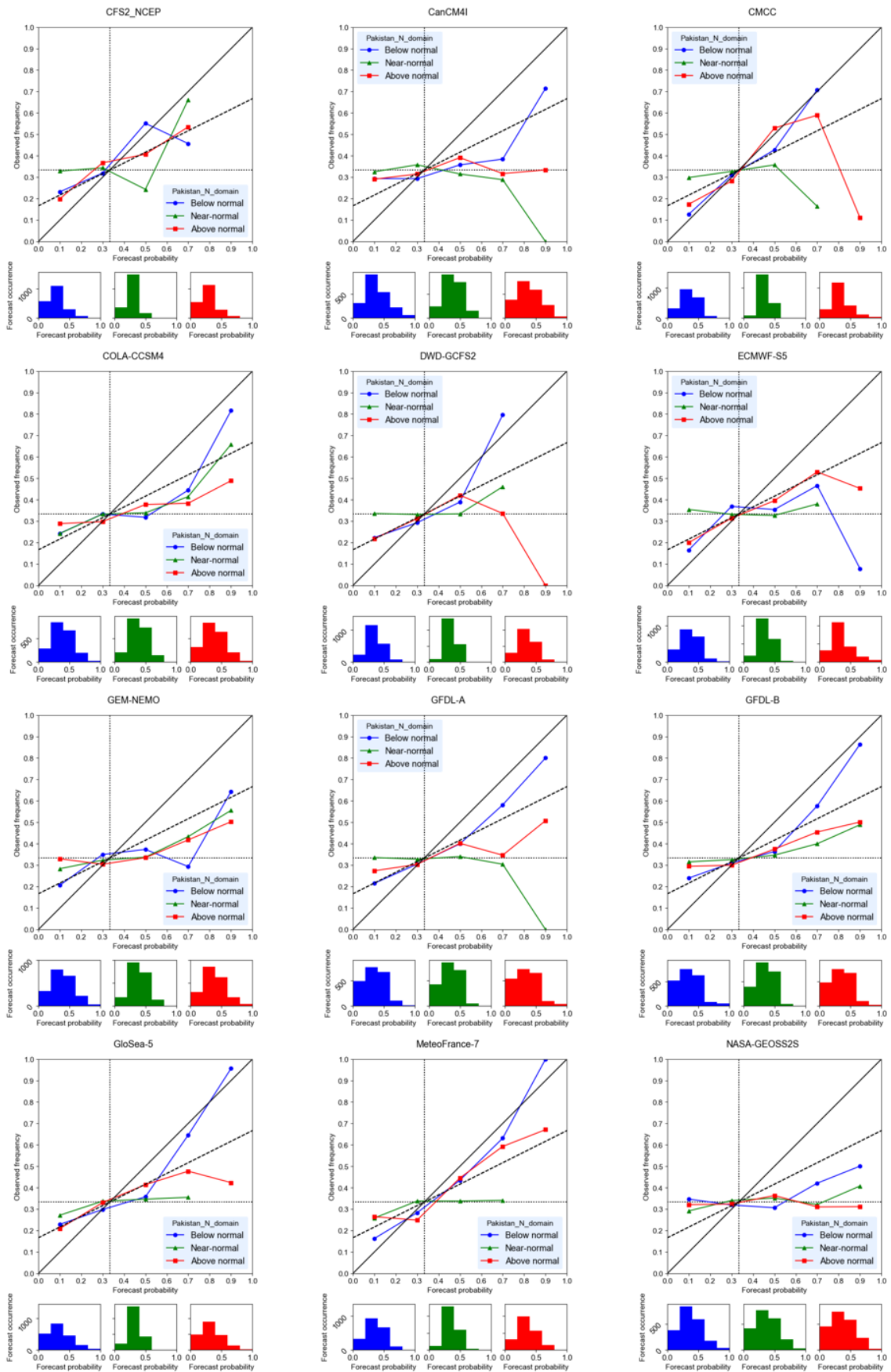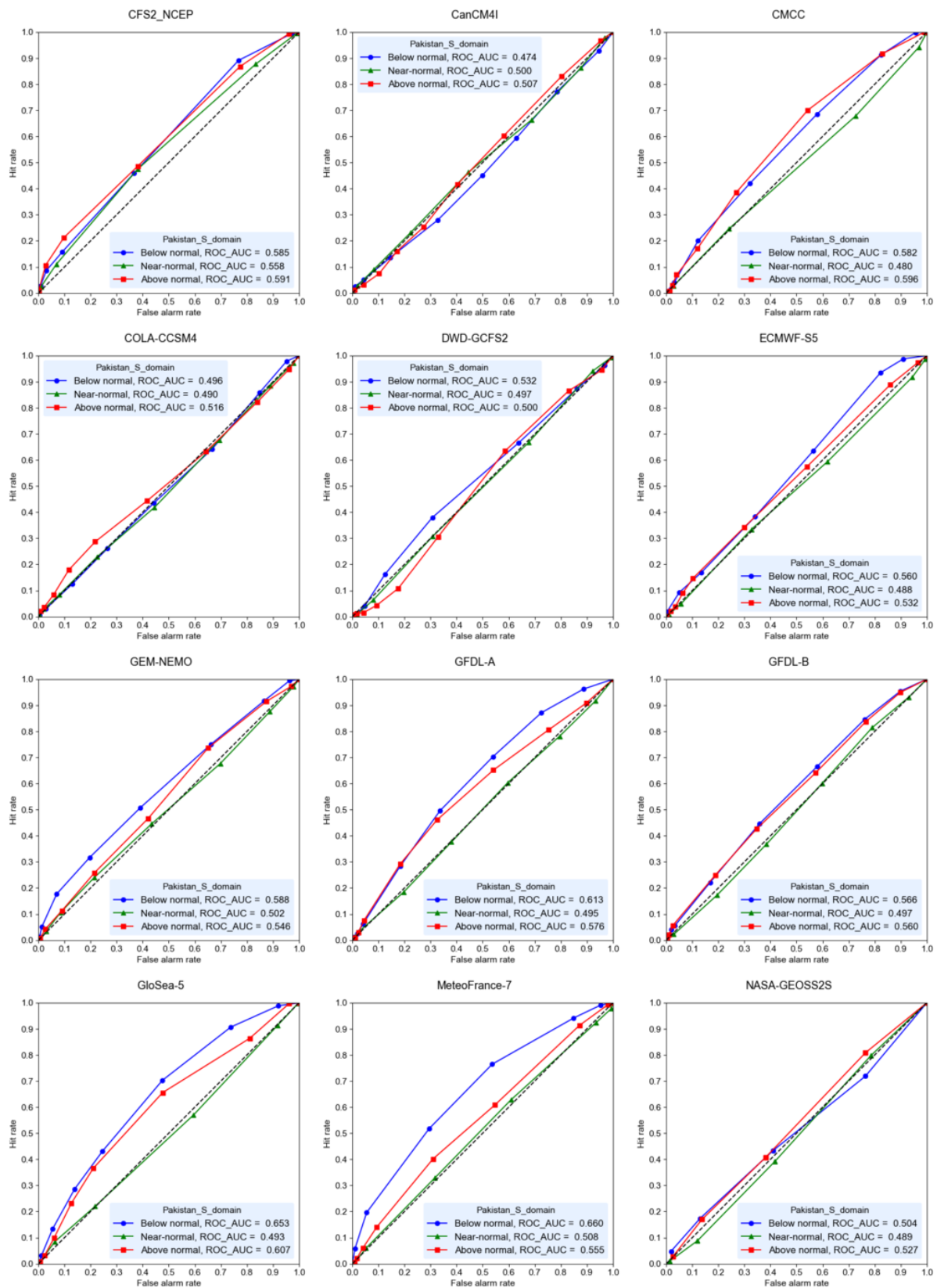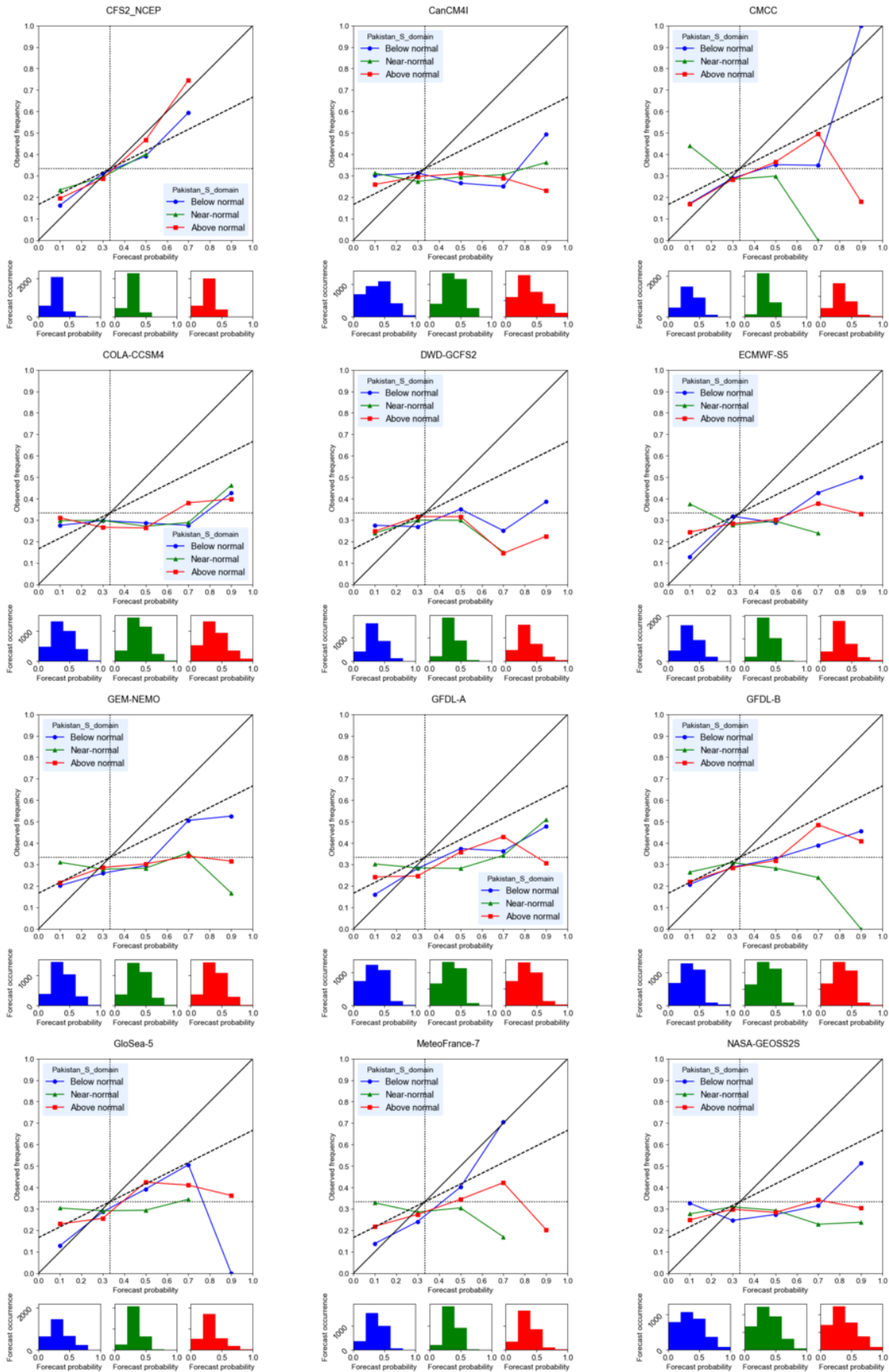
Figure A15-ii: Reliability diagrams for hindcasts of OND total precipitation for 1993-2016 from each of the models over the Pakistan South domain

Appendix 16 – The ONI index and model precipitation correlation for JJAS and OND
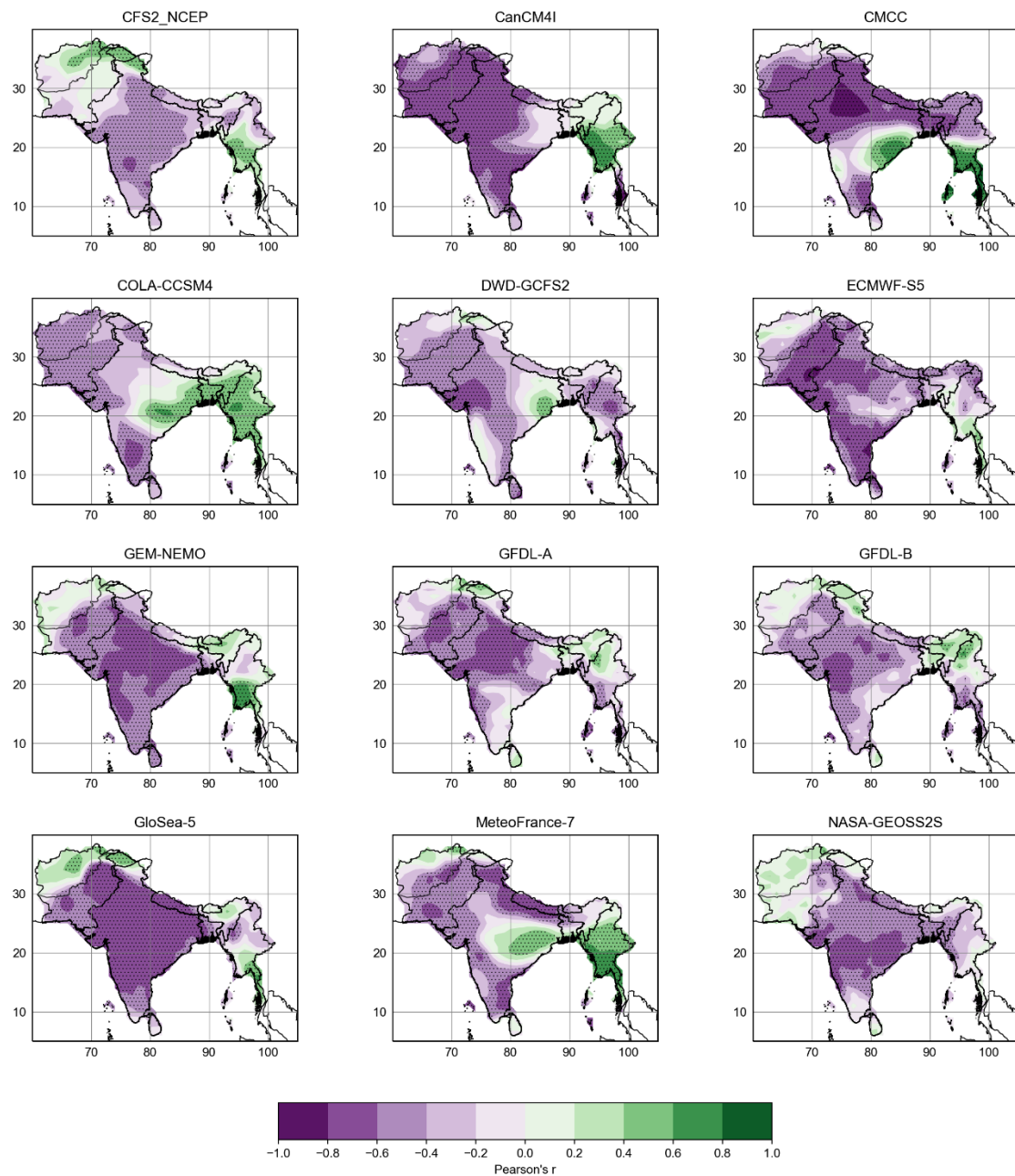

Figure A16-i: Pearson's correlation between the ONI index and mean precipitation each of seasonal prediction systems for the JJAS season from 1993 to 2016. Stippling marks statistical significance at the 95% confidence level.
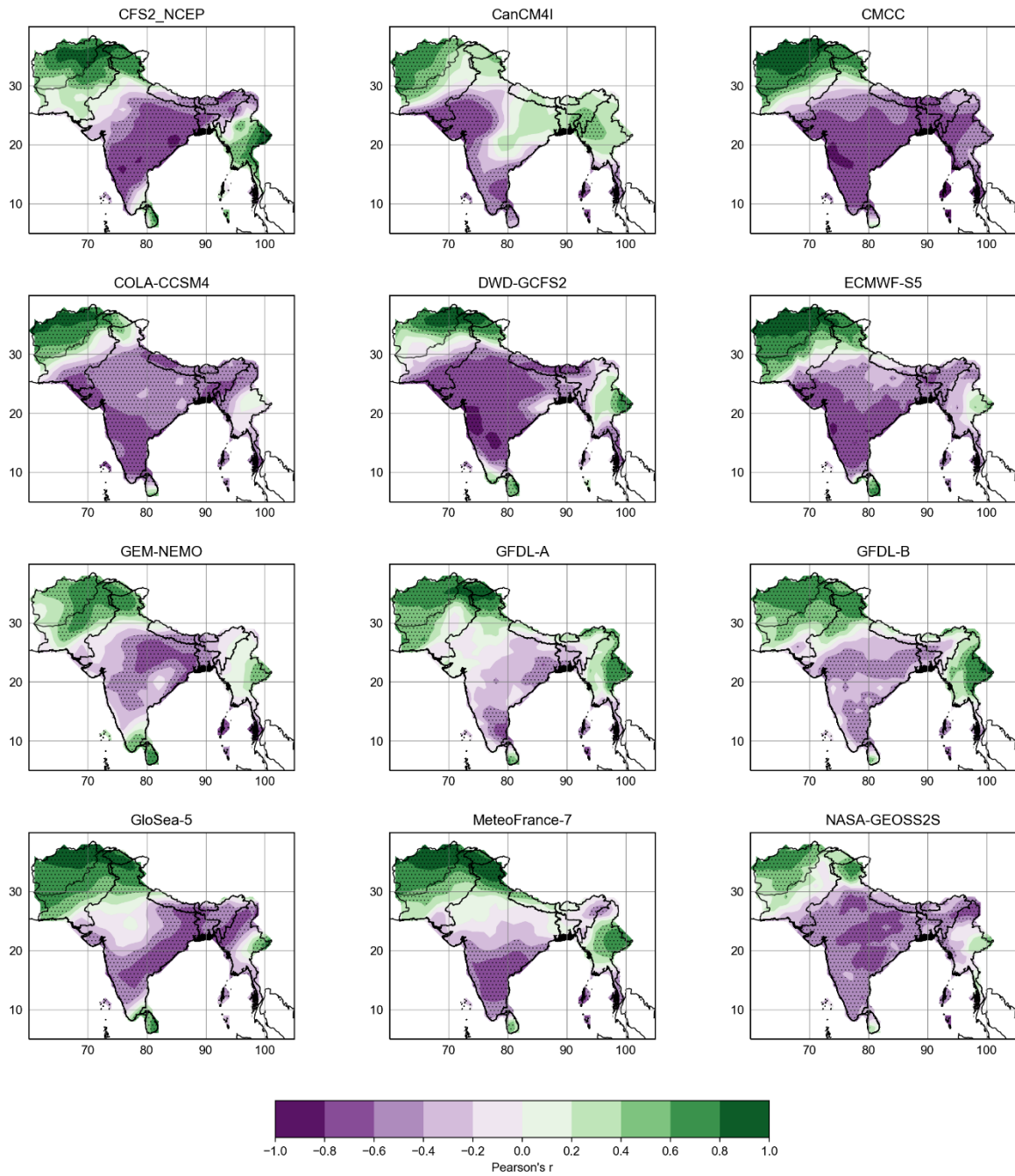
Figure A16-ii: Pearson's correlation between the ONI index and mean precipitation each of seasonal prediction systems for the OND season from 1993 to 2016. Stippling marks statistical significance at the 95% confidence level.

Appendix 17 – IOD-precipitation relationship against model skill for JJAS (top) and OND (bottom)
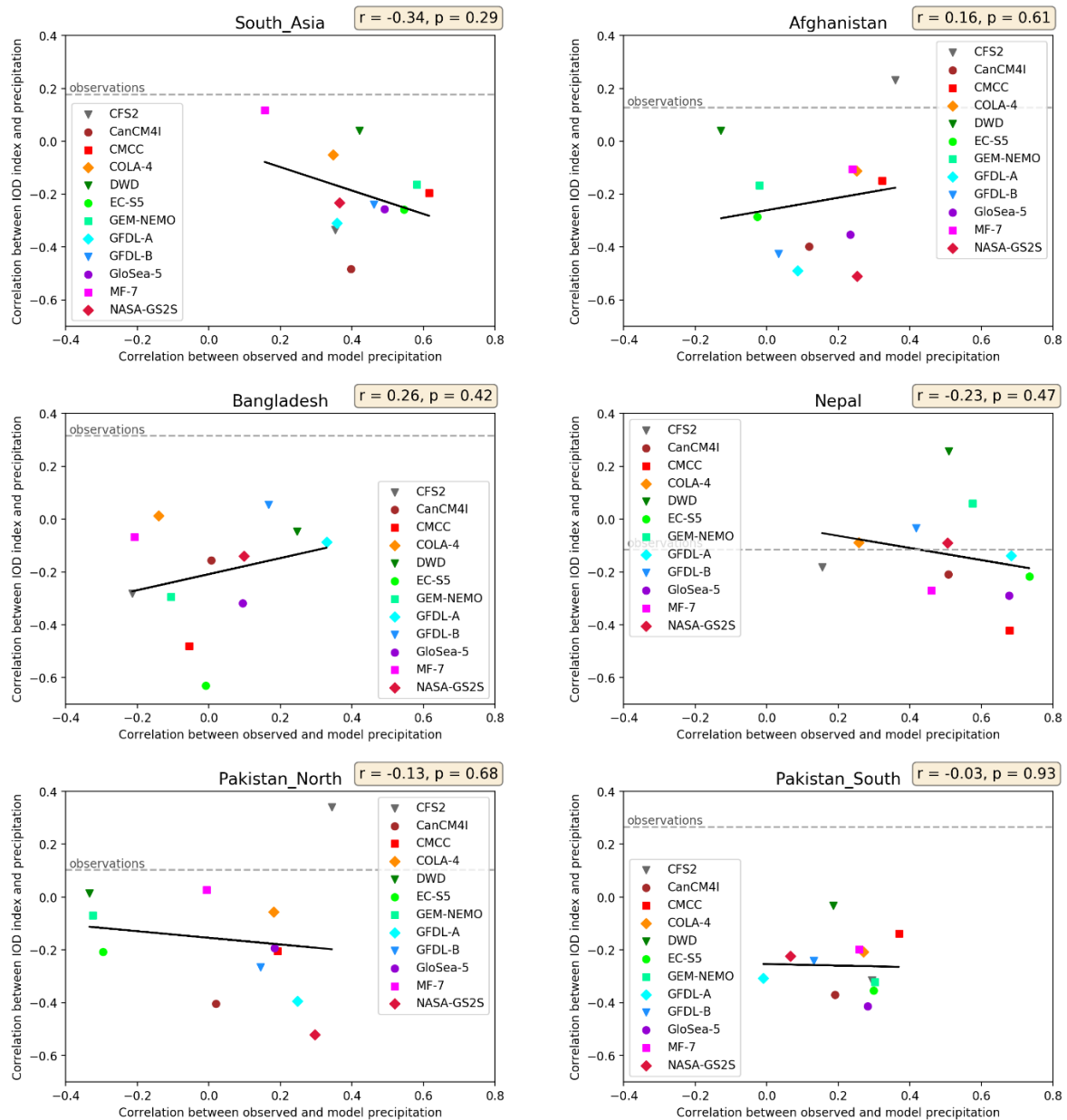

Figure A17-i - Scatterplot of correlation between the IODMI index and precipitation (y-axis) against correlation between observed and model precipitation (x-axis) for the JJAS season from 1993 to 2016. The correlation coefficient (r) and p-value (p) are stated in the box at the top-right of each plot; note that p<0.05 represents significance at 95% confidence level. The dashed grey line marked "observations" represents the correlation between the IODMI index and observed precipitation. Precipitation is spatially averaged over South Asia and each of the country-specific domains in the plot titles. The black line represents the line of best fit between the 12 points.
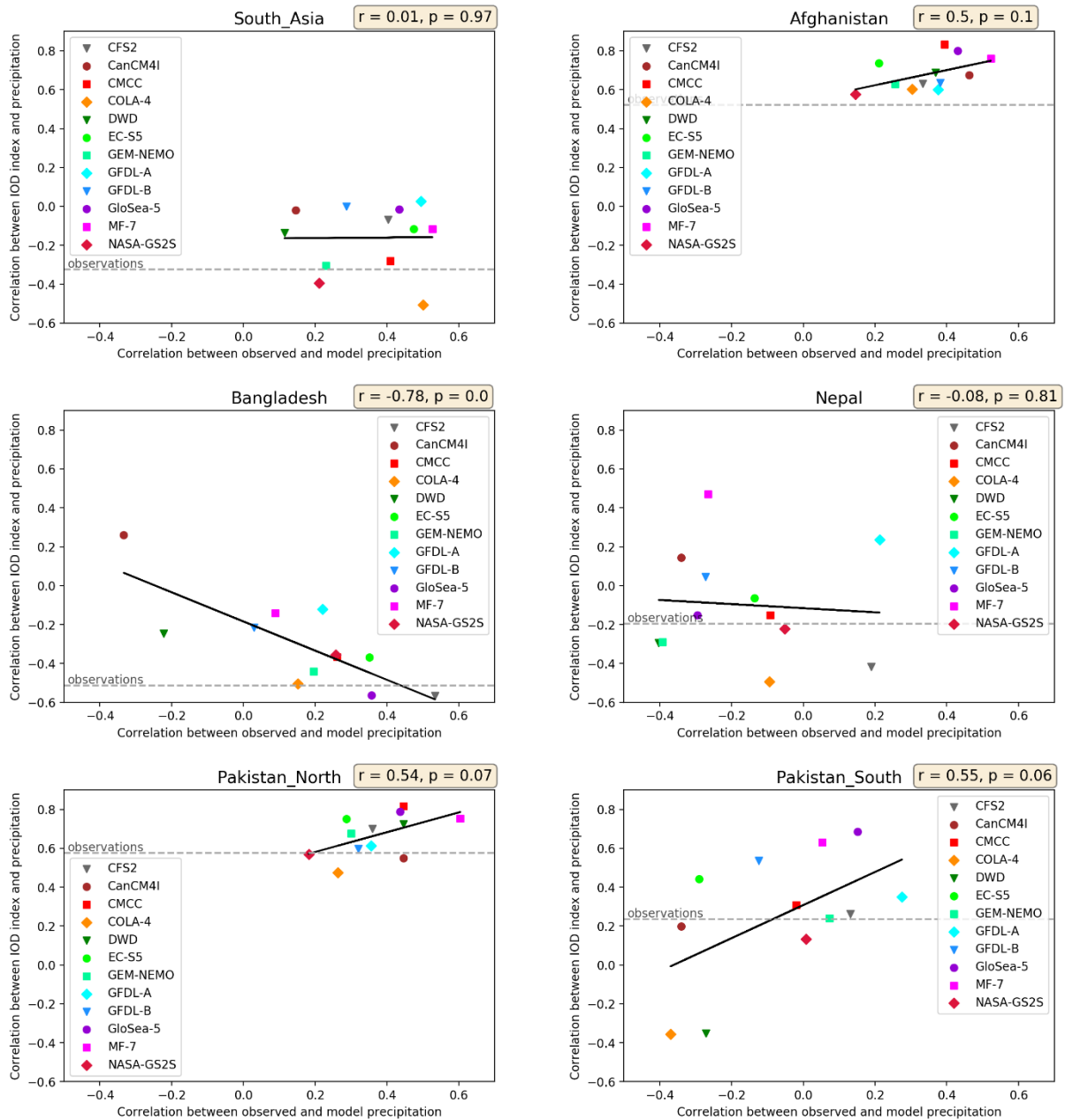
*Figure A17-ii - As caption for Figure 17-i**Error! Reference source not found.**, but for the OND season.*