**Supplementary Information**

In this section, we present the fitting trend for the three phases i.e. Train, Test and All (Train + Test) of the model presented in this study.

1. **This Study**
2. Oil relative permeability

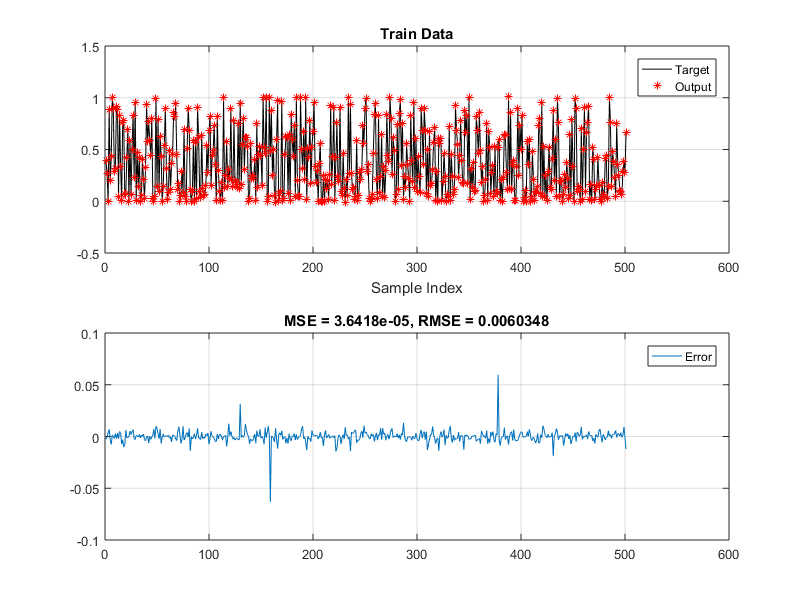


Fig. D1. Predictive accuracy of the oil relative permeability for the training phase using SCM

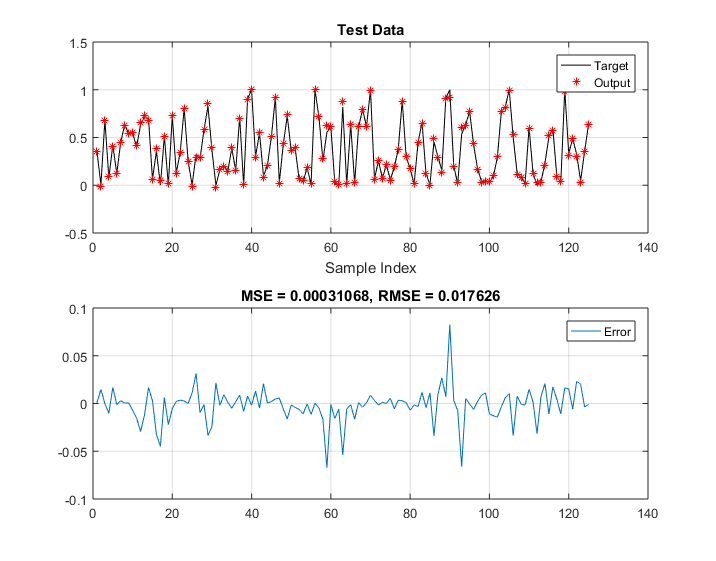


Fig. D2. Predictive accuracy of the oil relative permeability for the testing phase using SCM

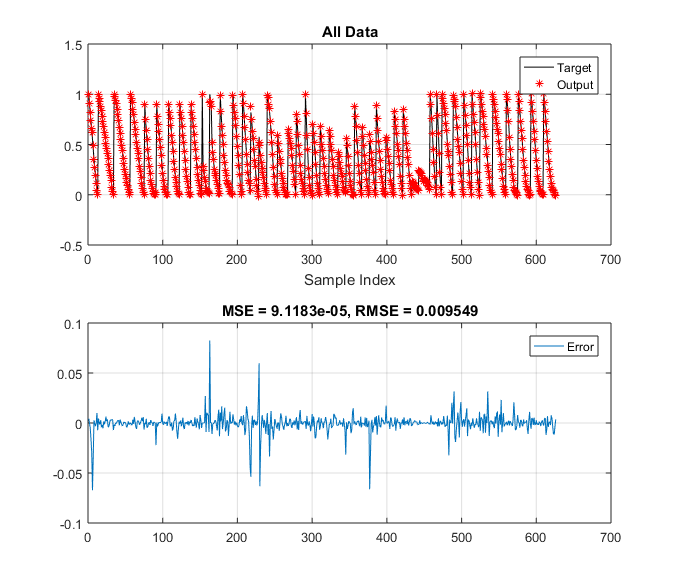


Fig. D3. Predictive accuracy of the oil relative permeability for the combined (Train + Test) phase using SCM

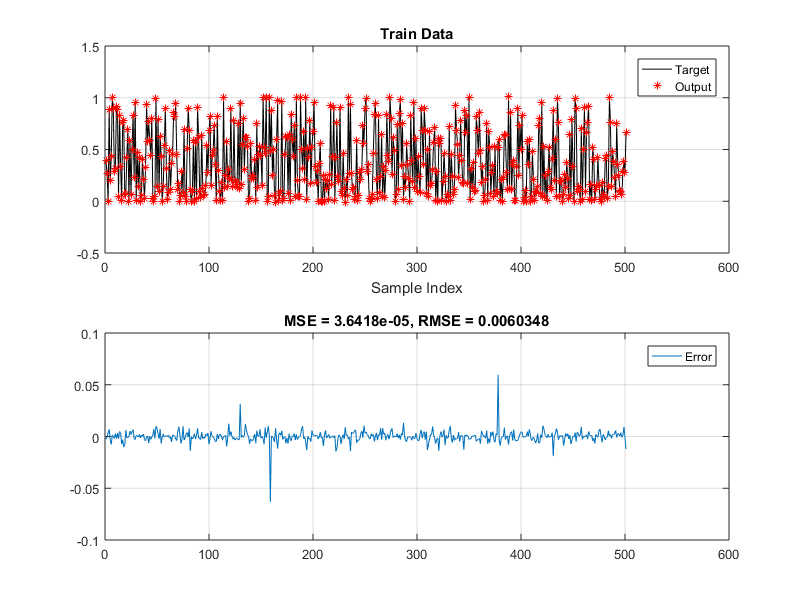


Fig. D4. Predictive accuracy of the oil relative permeability for the training phase using FCM

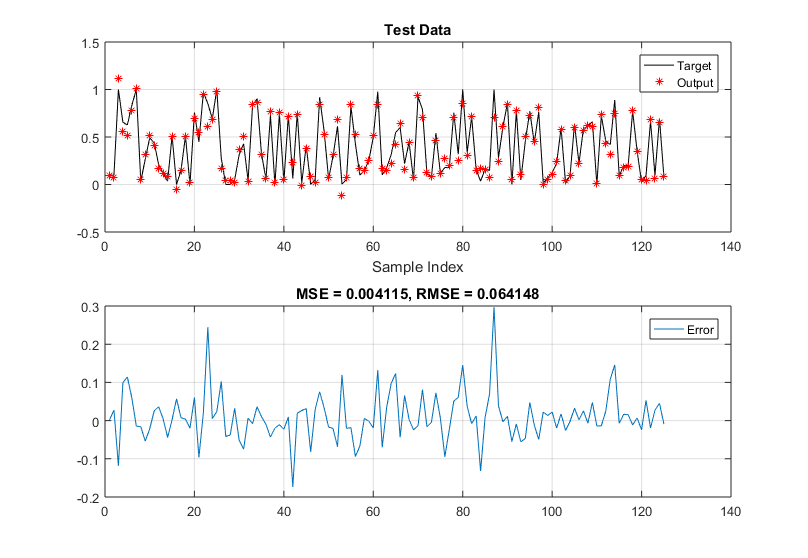


Fig. D5. Predictive accuracy of the oil relative permeability for the testing phase using FCM

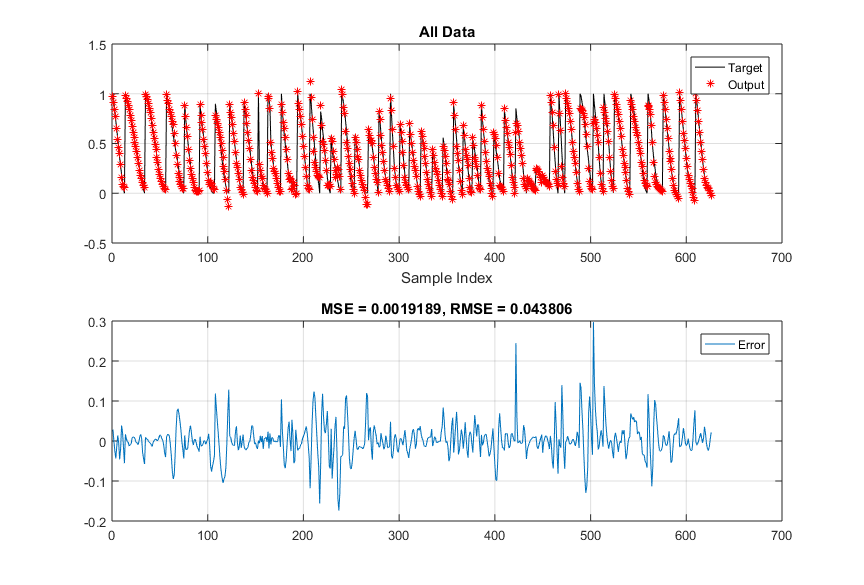


Fig. D6. Predictive accuracy of the oil relative permeability for the combined (Train + Test) phase using SCM

1. Water relative permeability

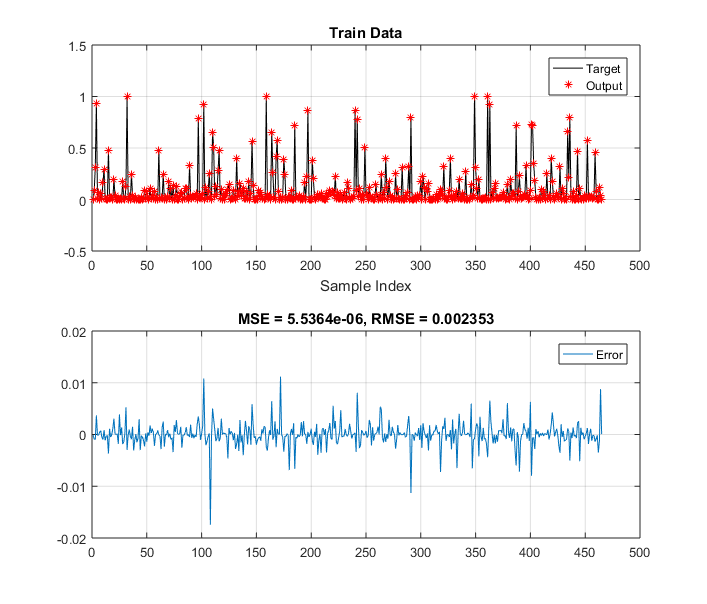


Fig. D7. Predictive accuracy of the water relative permeability for the training phase using SCM

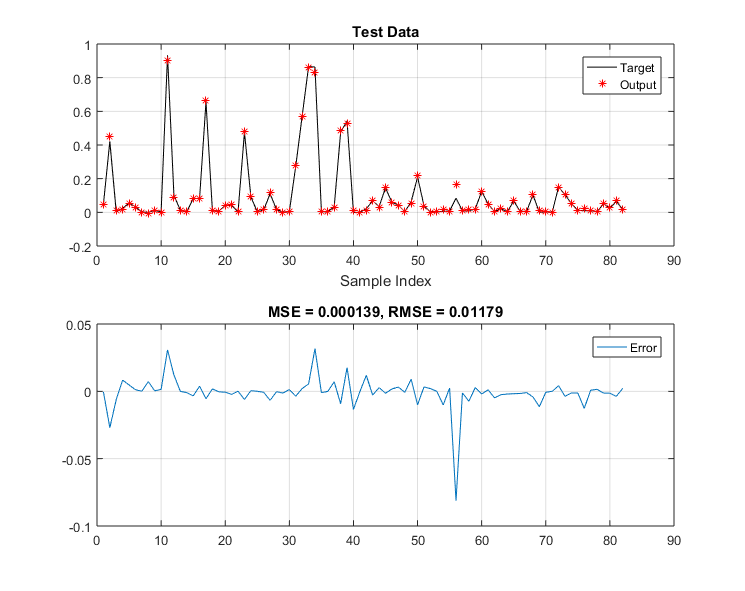


Fig. D8. Predictive accuracy of the water relative permeability for the testing phase using SCM

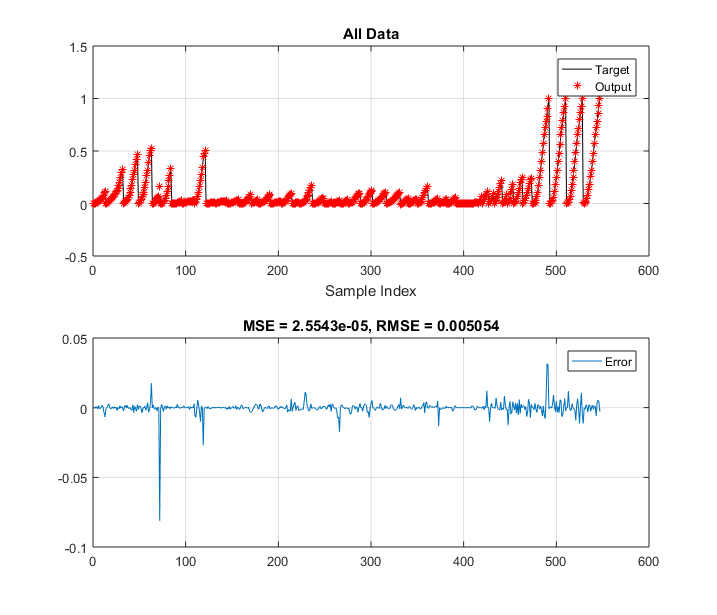


Fig. D9. Predictive accuracy of the water relative permeability for the combined (Train +Test) phase using SCM

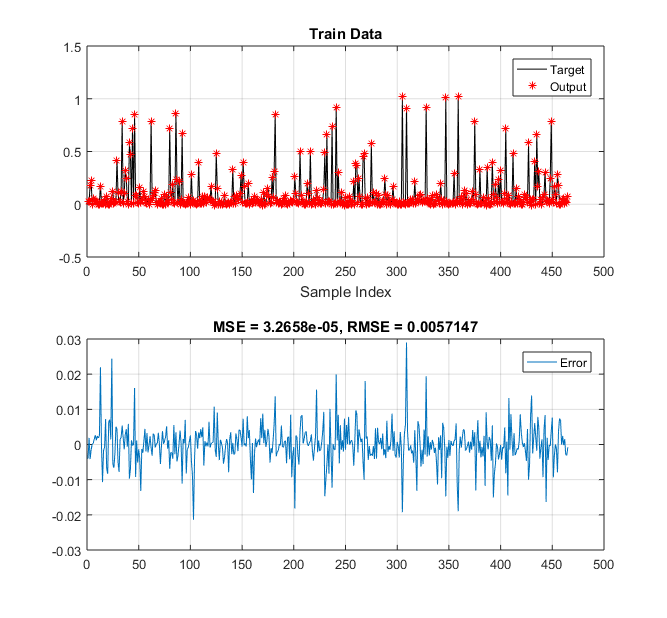


Fig. D10. Predictive accuracy of the water relative permeability for the training phase using FCM

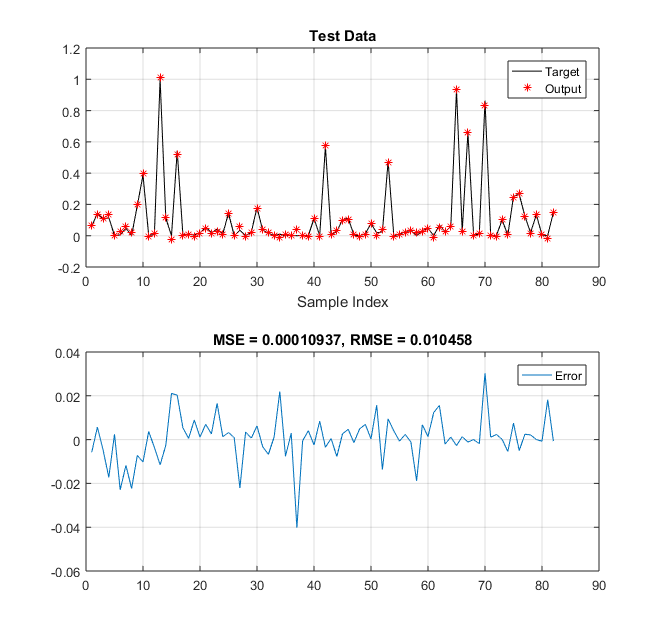


Fig. D11. Predictive accuracy of the water relative permeability for the testing phase using FCM

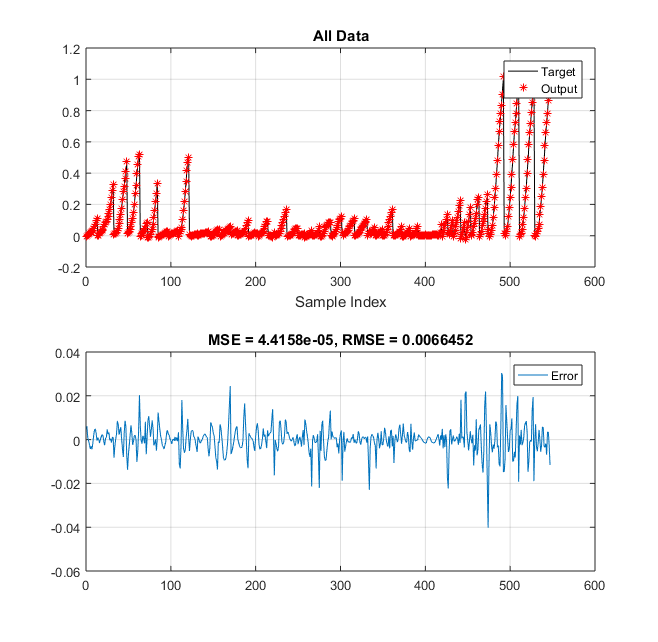


Fig. D12. Predictive accuracy of the water relative permeability for the combined (Train + Test) phase using SCM

1. LSSVM

In applying the model proposed by Esmaeili et al[1], the training and testing phase.

1. Oil relative permeability

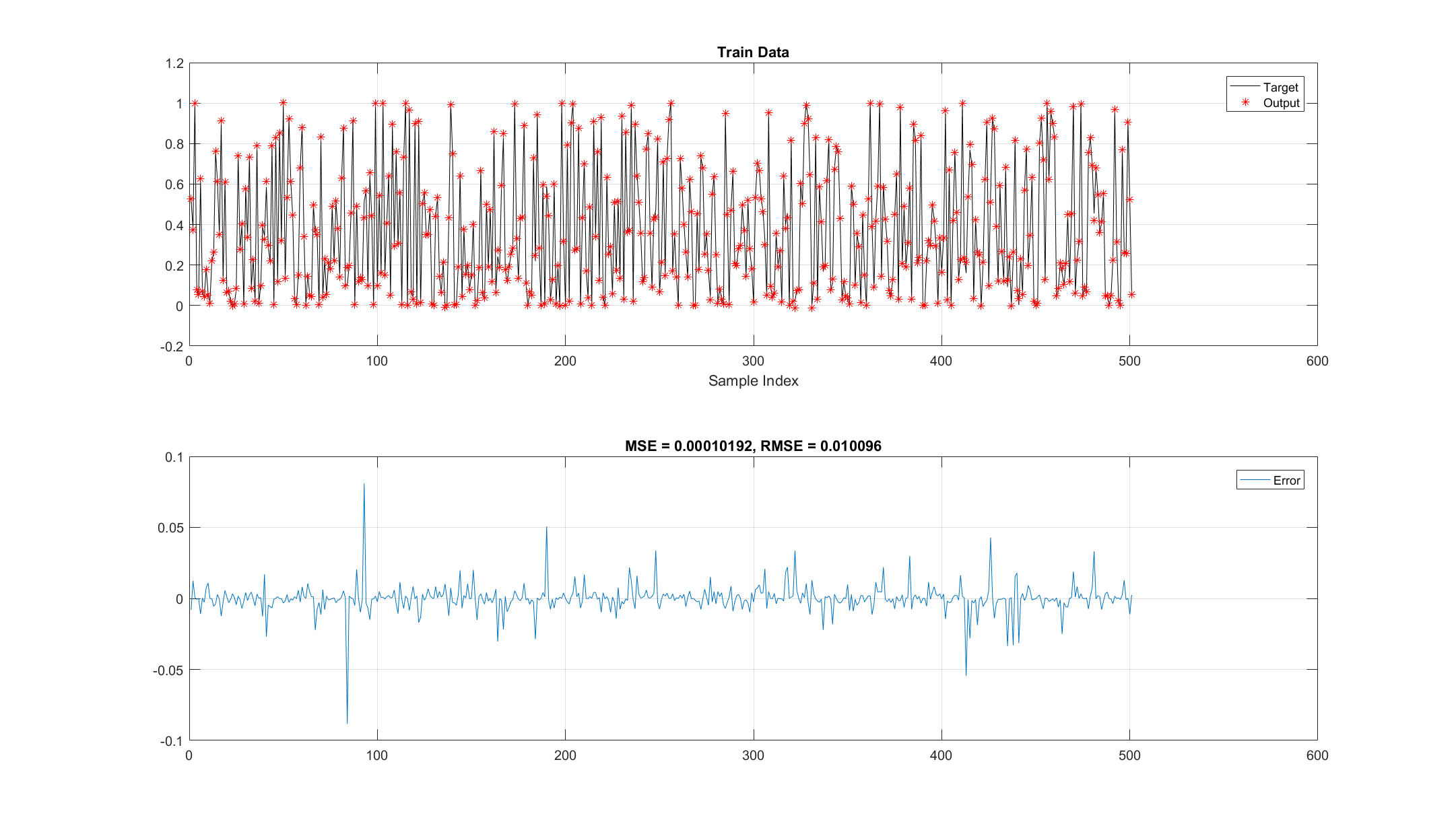


Fig. D13. Predictive accuracy of the oil relative permeability for the training phase using LSSVM

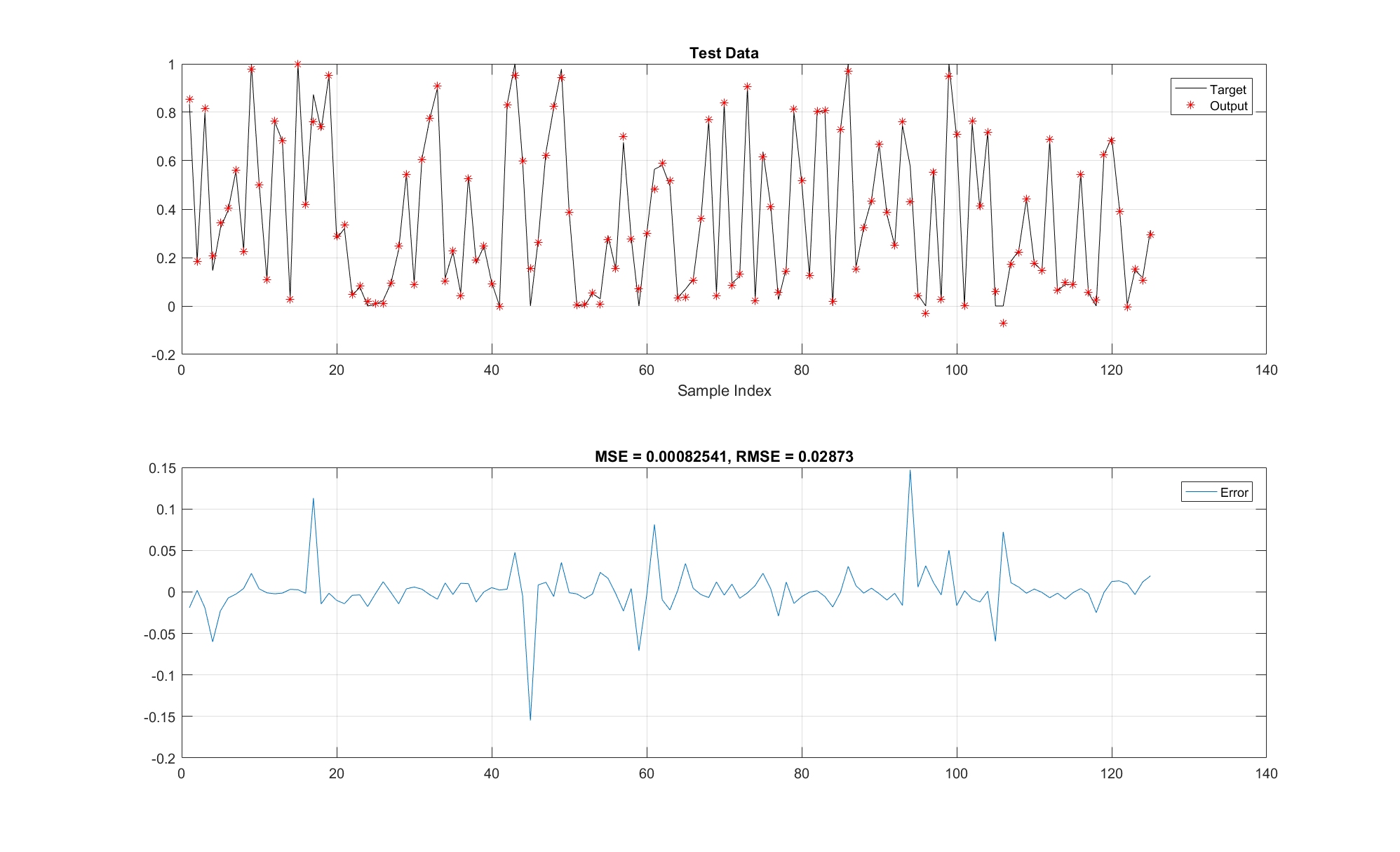


Fig. D14. Predictive accuracy of the oil relative permeability for the Test phase using LSSVM

1. Water relative permeability

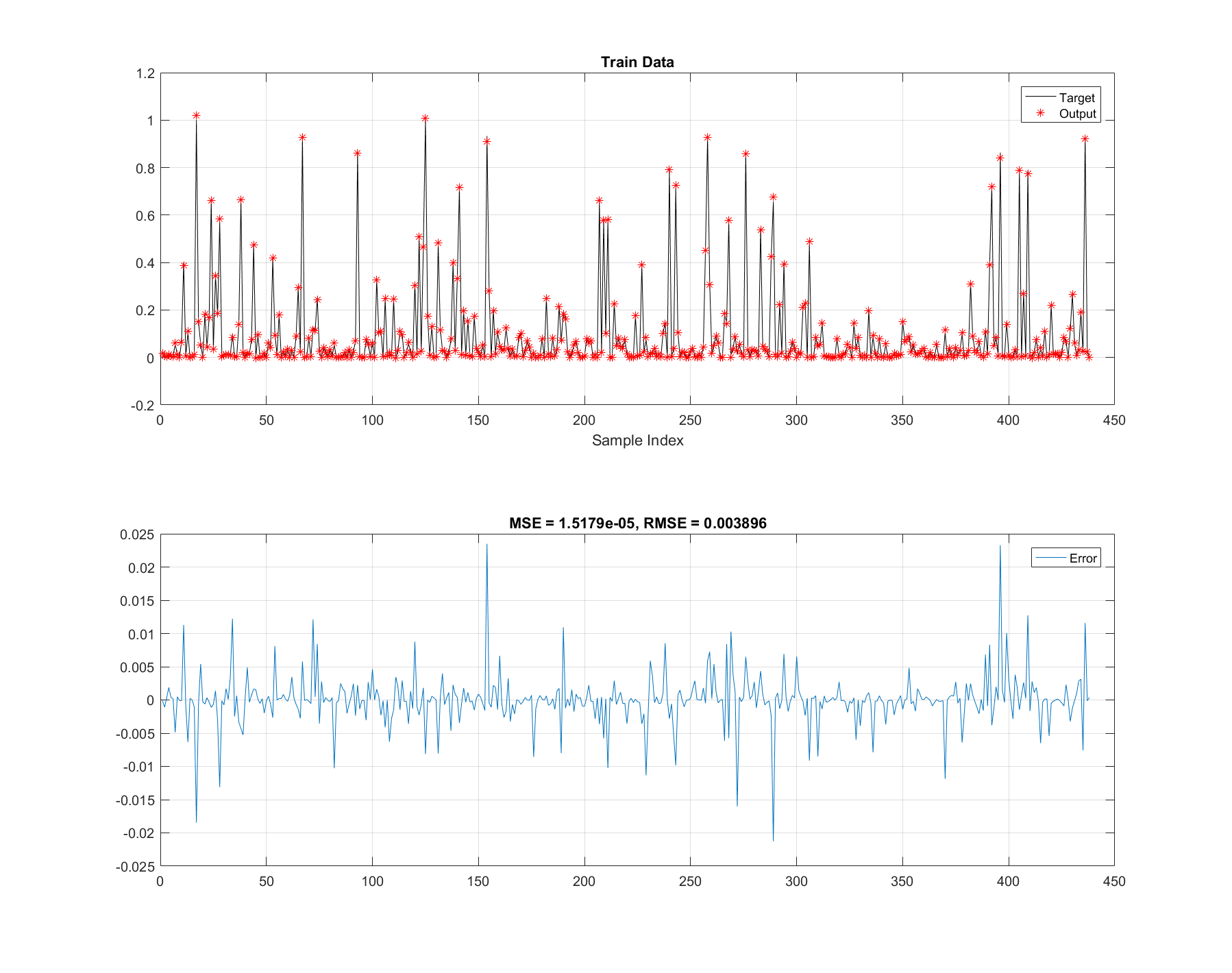


Fig. D15. Predictive accuracy of the water relative permeability for the Train phase using LSSVM

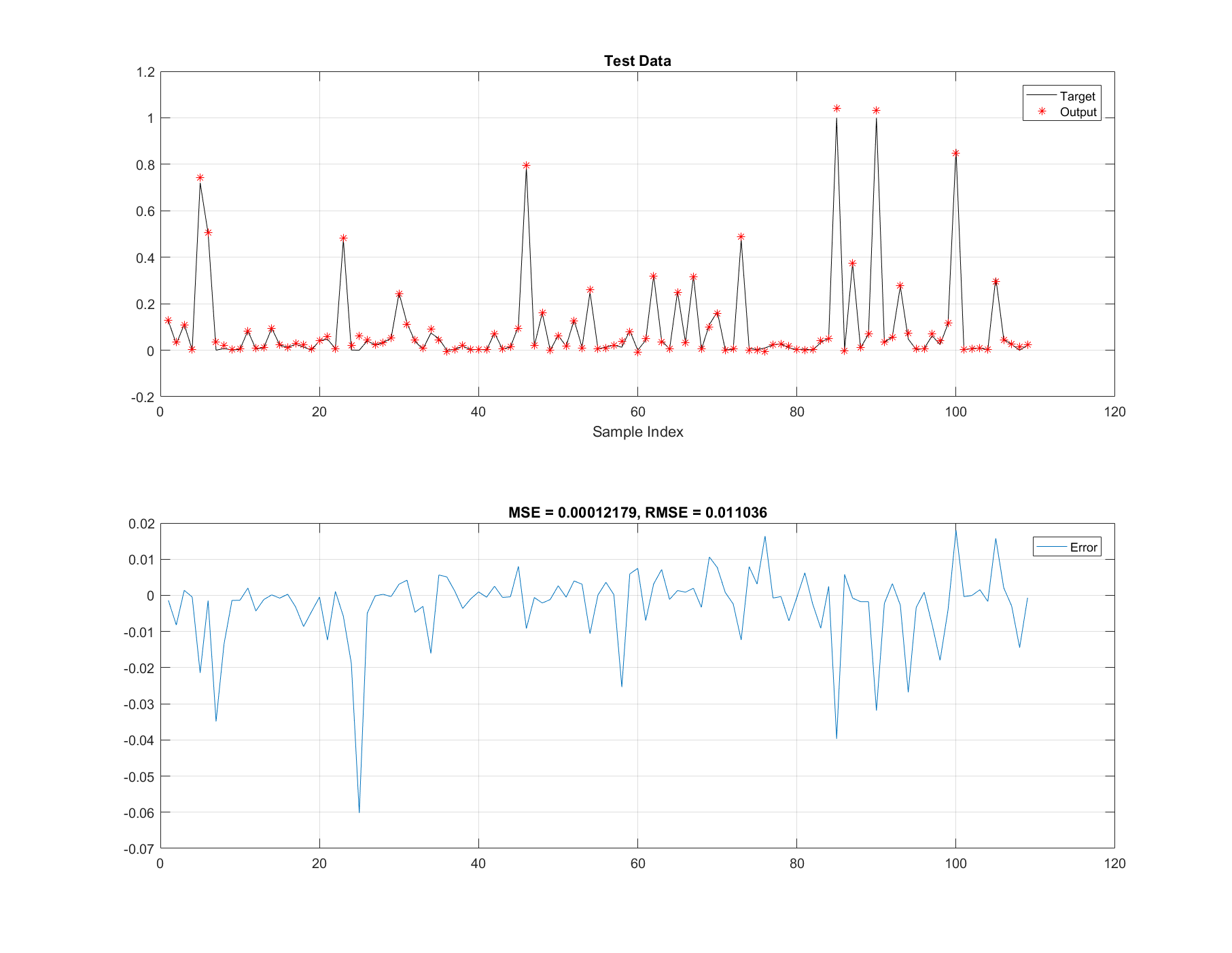


Fig. D16. Predictive accuracy of the water relative permeability for the Test phase using LSSVM

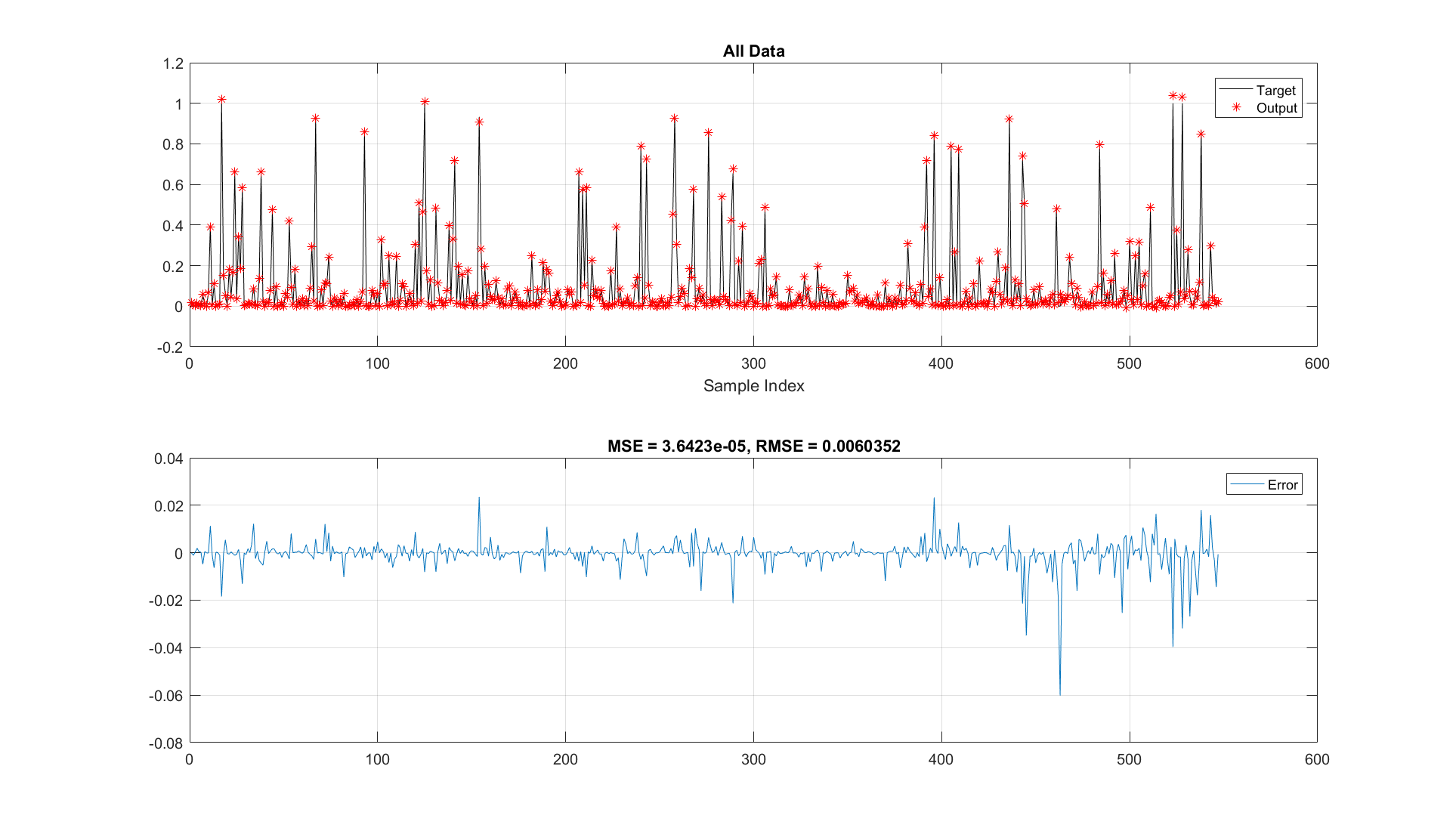


Fig. D17. Predictive accuracy of the water relative permeability for the combined (Train + Test) phase using LSSVM