**Supplementary 2: Surface Reflectance Parameters and Indices**

**28 Parameters:**

1. 6 Surface Reflectance bands – Blue, Green, Red, NIR, SWIR1, SWIR2
2. 11 Normalized Band Combinations

# Blue and Red: NBR <- (Blue-Red)/(Blue+Red)

# Blue and green: NBG <- (Blue-Green)/(Blue+Green)

# Blue and NIR: NBNIR <- (Blue-NIR)/(Blue+NIR)

# Blue and SWIR1: NBSWIR1 <- (Blue-SWIR1)/(Blue+SWIR1)

# Blue and SWIR2: NBSWIR2 <- (Blue-SWIR2)/(Blue+SWIR2)

# Red and SWIR1: NRSWIR1 <- (Red-SWIR1)/(Red+SWIR1)

# Red and SWIR2: NRSWIR2 <- (Red-SWIR2)/(Red+SWIR2)

# Green and SWIR1: NGSWIR1 <- (Green-SWIR1)/(Green+SWIR1)

# Green and SWIR2: NGSWIR2 <- (Green-SWIR2)/(Green+SWIR2)

# NIR and SWIR1: NNIRSWIR1 <- (NIR-SWIR1)/(NIR+SWIR1)

# NIR and SWIR2: NNIRSWIR2 <- (NIR-SWIR2)/(NIR+SWIR2)

1. 11 Widely used salinity and other indices

# Salinity Index 1 = sqrt(green^2+red^2)

SI1 <- sqrt((Green)^2 + (Red)^2)

# Salinity Index 2 = sqrt(green x red)

SI2 <- sqrt(Green \* Red)

# Salinity Index 3 = sqrt(blue x red)

SI3 <- sqrt(Blue \* Red)

# salinity index 4 = red x NIR / green

SI4 <- (Red \* NIR / Green)

# salinity index 5 = blue/red

SI5 <- (Blue / Red)

# Soil Adjusted Vegetation Index (SAVI) = ((1.5)x NIR) - (red/0.5) + NIR + Red

SAVI <- (1.5 \* NIR) - (0.5 \* Red) + NIR + Red

# Vegetation Soil Salinity Index (VSSI) = (2 x green) - 5 x (red + NIR)

VSSI <- (2 \* Green) - 5 \* (Red + NIR)

# NDVI

NDVI <- (Red-Green)/(Red+Green)

# NDWI

NDWI <- (Green-NIR)/(Green+NIR)

# NDSI2 or Normalised Difference Salinity Index 2 as per as per Khan et al 2001 in Nguyen et al 2020)

NDSI2 <- (Red-NIR)/(Red+NIR)

# NDSI as per the Index Database: https://www.indexdatabase.de/db/is.php?sensor\_id=168 )

NDSI1 <- (SWIR1-SWIR2)/(SWIR1+SWIR2)

**Correlation matrix**



**Regression model fit results with EC**

| **Table 1:** Regression coefficients of univariate relationships between EC and various parameters starting with the highest explanatory powers | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Band/Index** | **Fit** | **β₀** | **SE (β₀)** | **β₁** | **SE(β₁)** | **β2** | **SE (β2)** | **R2** | **Adj R2** | **AIC** | **BIC** | **RMSE** |
| **NDWI** | Polynomial (quad) | 1896.20 | 177.98 | 10932.14 | 1631.20 | 4088.29 | 1631.20 | **0.39** | **0.37** | 1486.00 | 1495.80 | 1601.81 |
| **NDSI2** | Polynomial (quad) | 1896.20 | 180.41 | 9731.52 | 1653.45 | 5966.86 | 1653.45 | **0.37** | **0.36** | 1488.30 | 1498.00 | 1623.66 |
| **NDWI** | Linear | 8098.46 | 972.29 | 15322.05 | 2358.71 |  |  | **0.34** | **0.33** | 1490.30 | 1497.60 | 1662.76 |
| **NIR** | Polynomial (quad) | 1896.20 | 191.69 | -9292.76 | 1756.82 | 3923.95 | 1756.82 | **0.29** | **0.27** | 1498.50 | 1508.20 | 1725.16 |
| **NRSWIR2** | Polynomial (quad) | 1896.20 | 192.15 | 6131.74 | 1761.05 | -7933.99 | 1761.05 | **0.29** | **0.27** | 1498.90 | 1508.60 | 1729.32 |
| **NDSI2** | Linear | 5827.36 | 740.85 | 10155.36 | 1847.64 |  |  | **0.27** | **0.26** | 1498.80 | 1506.10 | 1749.32 |
| **NBNIR** | Polynomial (quad) | 1896.20 | 194.29 | 9058.04 | 1780.65 | 3588.26 | 1780.65 | **0.27** | **0.25** | 1500.80 | 1510.5 | 1748.57 |
| **NDWI** | Log Linear | 10.13 | 0.60 | 7.89 | 1.47 |  |  | **0.26** | **0.25** | 1414.50 | 1421.80 | 1.03 |
| **NIR** | Linear | 9751.56 | 1533.38 | -36597.69 | 7085.17 |  |  | **0.25** | **0.24** | 1501.50 | 1508.80 | 1777.50 |
| **NBNIR** | Linear | 9065.56 | 1449.01 | 12148.39 | 2432.33 |  |  | **0.23** | **0.22** | 1502.90 | 1510.20 | 1791.86 |
| **NRSWIR1** | Linear | 7977.23 | 1271.23 | 14762.02 | 3047.83 |  |  | **0.22** | **0.21** | 1504.00 | 1511.30 | 1804.45 |
| **SAVI** | Polynomial (quad) | 1896.20 | 199.41 | -8484.27 | 1827.59 |  |  | **0.23** | **0.21** | 1505.10 | 1514.90 | 1794.65 |
| **NRSWIR1** | Polynomial (quad) | 1896.20 | 199.44 | 8845.69 | 1827.88 |  |  | **0.23** | **0.21** | 1505.20 | 1514.90 | 1794.94 |
| **NGSWIR1** | Polynomial (quad) | 1896.20 | 199.76 | 5523.74 | 1830.79 | -7053.17 | 1830.79 | **0.23** | **0.21** | 1505.40 | 1515.20 | 1797.80 |
| **SAVI** | Linear | 9671.47 | 1704.71 | -13312.60 | 2898.29 |  |  | **0.21** | **0.20** | 1505.90 | 1513.20 | 1824.99 |