

CHAPTER 8

References

- Analytical imaging and geophysics LLC., 2002. ACORN 4.0 (User's Guide: ImSpec LLC).
- Arnon, D.I., 1949. Copper enzymes in isolated chloroplasts. Polyphenoloxidase in *Beta vulgaris*. Plant Physiology, 24,483-485.
- Arroyo-Mora, J.P., Sanchez-Azofeifa, G.A., Kalacska, M., Rivard, B., Calvo-Alvarado, J.C., Janzen, D., 2005. Secondary forest detection in a Neotropical dry forest using Landsat 7 ETM+ and IKONOS imagery. Biotropica 37, 497–507.
- Asner, G.P., 2008. Hyperspectral Remote Sensing of Canopy chemistry, Physiology, and biodiversity in Tropical Rain Forests. Hyperspectral remote sensing of tropical and sub-tropical forest. Kalacska, M., Arturo Sanchez-Azofeifa, G., (Ed). pp.161-196 (CRC press Taylor and Francis group)
- Asner, G.P., and Martin, R.E., 2008. Spectral and chemical analysis of tropical forests: Scaling from leaf to canopy levels. Remote Sensing of Environment 12, 3958-3970.
- Asner, G., and Vitousek, P., 2005. Remote analysis of biological invasion and biogeochemical change. Proceedings of the National Academy of Sciences 102, 4383–4386.
- Asner, G., Martin, R., Carlson, K., Rascher, U., Vitousek, P., 2006. Vegetation-climate interactions among native and invasive species in Hawaiian rainforest. Ecosystems 9, 1106–1117.
- Asner, G.P., Scurlock, J.M.O., Hicke, J.A., 2003. Global synthesis of leaf area index observations: Implications for ecological and remote sensing studies. Global Ecology and Biogeography 12, 191–205.
- Aspinall, R.J., Marcus, W.A., Boardman, J.W., 2002. Considerations in collecting, processing, and analysing high spatialresolution hyperspectral data for environmental investigations. Journal of Geographical Systems 4, 15-29.
- Atkinson, P.M., and Tatnall, A.R.L., 1997. Neural networks in remote sensing. International Journal of Remote Sensing 18, 699–709.
- Atzberger, C., Jarmer, T., Schlerf, M., Kötter, B., Werner, W., 2003. Spectroradiometric determination of wheat bio-physical variables: comparison of different empirical-statistical approaches. In:Goossens, R. (Eds.), Remote Sensing in Transitions, Proc. 23rd EARSeL symposium, Belgium, 2-5 June 2003, pp. 463-470.

- Bacour, C., Baret, F., Beal, D., Weiss, M., Pavageau, K., 2006. Neural network estimation of LAI, fPAR, fCover and LAIxCab from top of canopy MERIS reflectance data: principles and validation. *Remote Sensing of Environment* 105, 313-325.
- Ball, J.B.D. and Pandey, S., 1999: Global overview of teak plantations. Presented at Regional seminar, Chiang Mai, Thailand 26-29 January 1999.
- Banik, R.L. 1993: Teak in Bangladesh. In: *Teak in Asia* (edited by H. Wood). FORSPA publication 4, GCP/RAS/I34/ASB. Bangkok. Thailand.
- Barton, C.V.M., and North, P.R.J., 2001. Remote Sensing of canopy light use efficiency using the Photochemical Reflectance Index. Model and analysis. *Remote Sensing of Environment* 78, 273.
- Bawa, K.S., 2006. Hurdles for conservation science in India. *Current Science* 91, 1005.
- Berk, A., Bernstein, L.S., Robertson, D.C., 1989, MODTRAN: a moderate resolution model for LOWTRAN7. In GL-TR-89-0122 (Hanscom Air Force Base, MA: Air Force Geophysics Laboratories), pp. 28-35.
- Berk, A., Bernstein, L.S., Anderson, G.P., Acharya, P.K., Robertson, D.C., Chetwynd, J.H., Alder-Goldem, S.M., 1998, MODTRAN cloud and multiple scattering upgrades with application to AVIRIS. *Remote Sensing of Environment* 65, 367-375.
- Berlyn, G.P., and Ashton, P.M.S., 1996. Sustainability of forests. *Journal of Sustainable Forestry* 3, 77-89.
- Bingchao, K., and Shuzhen Z., 1993. Genetic Improvement of Teak in China. In: *Teak in Asia* (edited by H. Wood). FORSPA publication 4, GCP/RAS/I34/ASB. Bangkok. Thailand.
- Bischof, H., Schneider, W., A.J. Pinz, 1992. Multispectral classification of Landsat images using neural networks. *IEEE Transactions on Geoscience and Remote Sensing* 30, 482-490.
- Björkman, O., and Demmig-Adams, B., 1995. Regulation of photosynthetic light energy capture, conversion, and dissipation in leaves of higher plants. In E. -D. Schultze, and M. M. Caldwell (Eds.), *Ecophysiology of photosynthesis* (pp. 17-47). Berlin: Springer.
- Blackburn G.A., 1998. Spectral indices for estimating photosynthetic pigment concentrations: a test using senescent tree leaves. *International Journal of Remote Sensing* 19, 657-675.

- Blackburn, G.A., 2006. Hyperspectral remote sensing of plant pigments. *Journal of Experimental Botany* 58, 855–867.
- Blackburn, G.A. and Milton, E.J., 1995. Seasonal variations in the spectral reflectance of deciduous tree canopies. *International Journal of Remote Sensing* 16, 709-721.
- Booker, F.L., Anttonen S., Heagle, A.S., 1996. Catechin, proanthocyanidin and lignin contents of loblolly pine (*Pinus taeda* L.) needles after chronic exposure to ozone. *New Phytologist* 132, 483-492.
- Brandeis, T.J., and Suárez Rozo, M.D.R., 2005. Effects of model choice and forest structure on inventory-based estimations of Puerto Rican forest biomass. *Caribbean Journal of Science* 4, 250-268.
- Broge, N.H., and Leblanc, E., 2001. Comparing prediction power and stability of broadband and hyperspectral vegetation indices for estimation of green leaf area index and canopy chlorophyll density. *Remote Sensing of Environment* 76, 156- 172.
- Broge, N.H., and Mortensen, J.V., 2002. Deriving green crop area index and canopy chlorophyll density of winter wheat from spectral reflectance data: *Remote Sensing of Environment* 81, 45-57.
- Brown, L., Chen, J.M., Leblanc, S.G., Cihlar, J., 2000. A shortwave infrared modification to the simple ratio for LAI retrieval in boreal forests: An image and model analysis. *Remote Sensing of Environment* 71, 16-25.
- Brown, S. and Lugo, A.E., 1989. Biomass estimation methods for tropical forests with application to forest inventory data. *Forest science* 35, 881-902.
- Brown, S., and Lugo A.E., 1982. The Storage and Production of Organic Matter in Tropical Forests and Their Role in the Global Carbon Cycle *Biotropica* 14, 161-187.
- Burges, C.J.C., 1998. A tutorial on Support Vector Machines for pattern recognition. *Data Mining and Knowledge Discovery* 2, 121-167.
- Bystriakova, N., 2003. Distribution and conservation status of forest bamboo biodiversity in the Asia-Pacific Region. *Biodiversity and Conservation* 12, 1833-1841.
- Cameron, A.L., 1968. Forest tree improvement in Papua New Guinea. In: *Proceeding from the 9th Comm. For. Conference*.
- Camps-Valls, G., Bruzzone, L., 2005. Kernel-based methods for hyperspectral image classification. *IEEE Transactions on Geoscience and Remote Sensing* 43, 1351–1362.

- Cao, F.K., 2000. Leaf anatomy and chlorophyll content of 12 woody species in contrasting light conditions in a Bornean heath forest Canadian. *Journal of Botany* 78, 1245-1253.
- Carrascal, L.M., and Gordo I.G.O., 2009. Partial least squares regression as an alternative to current regression methods used in ecology. *Oikos* 118, 681-690.
- Castro-Esau, K. L., Sanchez-Azofeifa, A.G., Rivard, B., Wright, J.S., Quesada, M., 2006. Variability in Leaf Optical Properties of Mesoamerican Trees and the Potential for Species Classification. *American Journal of Botany* 93, 517-530.
- Ceccato, P., Flasse, S., Tarantola, S., Jacquemoud, S., Gre'goire, J.M., 2001. Detecting vegetation leaf water content using reflectance in the optical domain. *Remote Sensing of Environment* 77, 22-23.
- Ceccato, P., Gobron, N., Flasse, S., Pinty, B., Tarantola, S., 2002. Designing a spectral index to estimate vegetation water content from remote sensing data: Part 1 Theoretical approach. *Remote Sensing of Environment* 82, 188-197.
- Chambers J.Q., Asner G.P., Morton, D.C, Anderson L.O., Saatchi S.S., Fernando D.B. Santo. E.I., Palace, M., Souza C., 2007. Regional ecosystem structure and function: ecological insights from remote sensing of tropical forests. *TRENDS in Ecology and Evolution* 22, 414-423.
- Champion, H.G. and Seth. S.K., 1968. A Revised Survey of the Forest Types of India. Govt. of India Publications, New Delhi.
- Chan, J.C.W., and Palinckx, D., 2008. Evaluation of Random Forest and Adaboost tree-based ensemble classification and spectral band selection for ecotope mapping using airborne hyperspectral imagery. *Remote Sensing of Environment* 112, 2999-3011.
- Chen, J., 1996. Evaluation of vegetation indices and modified simple ratio for boreal applications. *Canadian journal of Remote Sensing* 22, 229-242.
- Cheng, Y.B., Zarco-Tejada, P.J., Riano, D., Rueda, C.A., Ustin, S.L., 2006. Estimating vegetation water content with hyperspectral data for different canopy scenarios: Relationships between AVIRIS and MODIS indexes. *Remote Sensing of Environment* 105, 354-366.
- Cho, M.A., Skidmore, A., Corsi, F., Wieren S.E.V., Sobhan, I., 2007. Estimation of green grass/herb biomass from airborne hyperspectral imagery using spectral

indices and partial least squares regression. *International Journal of Applied Earth Observation and Geoinformation* 9, 414-424

- Christian, B., and Krishnayya, N.S.R., 2007. Spectral signatures of teak (*Tectona grandis* L.) using hyperspectral (EO-1) data. *Current Science* 93, 1291-1296.
- Christian, B., and Krishnayya, N.S.R., 2009. Classification of tropical trees growing in a sanctuary using Hyperion (EO-1) and SAM algorithm. *Current Science* 96, 1601-1607.
- Cihlar, J.R., Denning, S., Ahern, F., Arino, O., Belward, A., Bretherton, F., et al., 2002. Initiative to quantify terrestrial carbon sources and sinks. *Eos. Transactions* 83, 6-7.
- Clark, D.B., Read, J.M., Clark, M.L., Cruz, A.M., Dotti, M.F., Clark, D.A. 2004. Application of 1-M and 4-M resolution satellite data to ecological studies of tropical rain forests. *Ecological Applications* 14, 61-74.
- Clark, M.L., Roberts, D.A., Clark, D.B., 2005. Hyperspectral discrimination of tropical rain forest tree species at leaf to crown scales. *Remote Sensing of Environment* 96, 375-398.
- Cohen, W.B., Maersperger, T.K., Yang, Z.Q., Gower, S.T., Turner, D. P., Ritts, W.D., et al., 2003. Comparisons of land cover and LAI estimates derived from ETM plus and MODIS for four sites in North America: A quality assessment of 2000/2001 provisional MODIS products. *Remote Sensing of Environment* 88, 233-255.
- Cohen, W.B., and Goward, S.N., 2004. Landsat's role in ecological application of remote sensing. *BioScience* 54, 535-545.
- Colombo R., Meroni, M., Marchesi A., Busetto L., Rossini M., Giardino C., Panigada C., 2008. Estimation of leaf and canopy water content in poplar plantations by means of hyperspectral indices and inverse modeling. *Remote Sensing of Environment* 112, 1820-1834.
- Congalton, R.G., 1991. A review of assessing the accuracy of classifications of remotely sensed data. *Remote Sensing of Environment* 37, 35- 46.
- Cunningham, F.X., and Schiff, J.A., 1986. Chlorophyll-Protein Complexes from *Euglena gracilis* and Mutants Deficient in Chlorophyll b'. *Plant Physiology* 80, 231-238.

- Curran P.J., Dungan, J.L., MacIer, B.A., Plummer S.E., 1991. The effect of a red leaf pigment on the relationship between red-edge and chlorophyll concentration. *Remote Sensing of Environment* 35, 69-75.
- Curran, P.J., 1989. Remote sensing of foliar chemistry. *Remote Sensing of Environment* 30, 271- 278.
- Curran, P.J., Dungan, J.L., Peterson, D.L., 2001. Estimating the foliar biochemical concentration of leaves with reflectance spectrometry: testing the Kokaly and Clark methodologies. *Remote Sensing of Environment* 76, 349-359.
- Daily, G.C., Alexander, S., Erlich, P.R., Goulder, L., Lubchenko, J., Matson, P.A., et al., 1997. Ecosystem services: Benefits supplied to human societies by natural ecosystems. *Issues in Ecology* (pp. 1–16). Washington, DC: Ecological Society of America (number 2).
- Dalponte, M., Bruzzone, L. Vescovo, L., Gianelle, D., 2009. The role of spectral resolution and classifier complexity in the analysis of hyperspectral images of forest areas. *Remote Sensing of Environment* 113, 2345-2355.
- Danson, F.M., Steven, M.D., Malthus, T.J., Clark, J.A., 1992. High spectral resolution data for determining leaf water content. *International Journal of Remote Sensing* 13, 461- 470.
- Darvishzadeh, R., Skidmore, A., Schlerf, M., Atzberger, C., Corsia, F., Choa, M., 2008. LAI and chlorophyll estimation for heterogeneous grassland using hyperspectral measurements. *ISPRS Journal of Photogrammetry and Remote Sensing* 63, 409-426.
- Dash, J., Jeganathan, C., Atkinson P.M., 2010. The use of MERIS Terrestrial Chlorophyll Index to study spatio-temporal variation in vegetation phenology over India. *Remote Sensing of Environment* 114, 1388-1402
- Datt B., 1998. Remote sensing of chlorophyll a, chlorophyll b, chlorophyll a+b and total carotenoid content in eucalyptus leaves. *Remote Sensing of Environment* 66, 111-121.
- Datta, M., and Singh, N.P., 2007. Growth characteristics of multipurpose tree species, crop productivity and soil properties in agroforestry systems under subtropical humid climate in India. *Journal of Forestry Research* 18, 261- 270.

- Daughtry, C.S.T, Walthall C.L., Kim, M.S., Brown de Colstoun E., McMurtrey J.E., 2000. Estimating corn leaf chlorophyll concentration from leaf and canopy reflectance. *Remote Sensing of Environment* 74, 229-239.
- Davies, A.M.C., 2001. Uncertainty testing in PLS regression. *Spectroscopy Europe* 13, 16-19.
- De Jong, S.M., Pebesma, E.J., Lacaze, B., 2003. Above-ground biomass assessment of Mediterranean forests using airborne imaging spectrometry: The DAIS Payne experiment. *International Journal of Remote Sensing* 24, 1505-1520.
- de Leeuw, Jia, J., Yang, H., Liu, L., Schmidt, X., Skidmore, A.K., 2006. Comparing accuracy assessments to infer superiority of image classification methods. *International Journal of Remote Sensing* 27, 223-232.
- Delalieux, S, Auwerkerken, A., Verstraeten, W.W., Somers, B., Valcke, R., Lhermitte, S., Keulemans, J., Coppin, P., 2009. Hyperspectral Reflectance and Fluorescence Imaging to Detect Scab Induced Stress in Apple Leaves. *Remote Sensing* 1, 858-874.
- Deota, B.S 1991. Geological studies in the south Gujarat Quaternary landscape with special reference to environmental planning and management. Ph.D thesis, The M.S University of Baroda.
- Despan, D. and Jacquemoend, S., 2004. Optical properties of soil and leaf: Necessity and problems of modeling. In: Schönermark, M. von, Geiger, B., Röser, H. P. (Eds.): *Reflection properties of vegetation and soil*. Berlin. Wissenschaft und Technik Verlag, 39-70.
- Du, Q., and Ren, H., 2003. Real-time constrained linear discriminant analysis to target detection and classification in hyperspectral imagery. *Pattern Recognition* 36, 1-12.
- Dudeni, N., Debba, P., Cho, M., Mathieu, R., 2009. *Hyperspectral Image and Signal Processing: Evolution in Remote Sensing*. Whispers-09 first workshop, 1-4.
- Elands, B.H.M., and O'Leary, T.N., 2002. The myth of forests: a reflection of the variety of their rural identifies in Europe and the role of forests in it. In *The Changing Role of Forestry in Europe; perspectives for rural development*. K.F. weirsum and B.H.M Elands (eds). Wageningen University, Wageningen, the Netherlands, 25-50.
- Ellis, E.C., Wang, H., Xiao, H., Peng, K., Liu, X.P., Li, S.C., Ouyang, H., Cheng, X., Yang, L.Z., 2006. Measuring long-term ecological changes in densely populated

landscapes using current and historical high resolution imagery. *Remote Sensing of Environment* 100, 457–473.

- Elvidge, C., and Chen, Z., 1995. Comparison of broadband and narrow bandred and near-infrared vegetation indices. *Remote Sensing of Environment* 54, 38-48
- Englhart, S., Keuck, V., Siegert, F., 2011. Aboveground biomass retrieval in tropical forests — The potential of combinedX- and L-band SAR data use. *Remote Sensing of Environment* 115, 1260-1271.
- Erbek, F.S., Ozkan, C., Taberner, M., 2004. Comparison of maximum likelihood classification method with supervised artificial neural network algorithms for land use activities. *International Journal of Remote Sensing* 25, 1733-1748.
- Estes, L.D., Reillo, P.R., Mwangi A.G., Okin, G.S., Shugart, H.H., 2010. Remote sensing of structural complexity indices for habitat and species distribution modeling. *Remote Sensing of Environment* 114,792-804.
- Evans, J.R., Vogelmann, T.C., Williams, W.E., Gorton, H. L., 2004. Chloroplast to leaf.In Smith, W., Vogelmann, T. C., and Critchley, C., (Eds.), *Photosynthetic adaptation: Chloroplast to landscape* (pp. 15–41). New York: Springer
- FAO. 2010. Global forest resources assessment, 2010 - Main report. FAO. Rome, Italy.
- Ferwerda J.G., and Jones S., 2005. Continuous wavelet transformations for hyperspectral feature detection. *Proceedings of the 12thinternational symposium on spatial data handling*, 12-14 July, University of Vienna, Austria.
- Field, C., and Mooney, H.A., 1986. The photosynthesis-nitrogen relationship in wildplants. In T. J. Givnish (Ed.), *On the economy of plant form and function* (pp. 25–55).Cambridge, UK: Cambridge Univ. Press.
- Filella, I., and Penuelas, J., 1994. The red edge position and shape as indicators of plant chlorophyll content, biomass and hydric status. *International Journal of Remote Sensing*, 15, 1459-1470.
- Foley, J.A., Asner, G.P., Costa, M.H., et al., 2007. Amazonia revealed: Forest degradation andthe loss of ecosystem goods and services in the Amazon Basin. *Frontiers in Ecologyand the Environment*, 5, 25-30.
- Foody, G.M., 2002. Status of land cover classification accuracy assessment. *Remote Sensing of Environment* 81,185-201.

- Foody, G.M., 2004. Supervised image classification by MLP and RBF neural networks with and without an exhaustively defined set of classes. *International Journal of Remote Sensing* 25, 3091-3104.
- Foody, G.M., Boyd, D.S., Cutler, M.E.J., 2003. Predictive relations of tropical forest biomass from Landsat TM data and their transferability between regions. *Remote Sensing of Environment* 85, 463-474.
- Fung, T., Ma, F.Y., Siu, W.L., 1999. Band selection using hyperspectral data of subtropical tree species. *Proceedings of Asian Conference on Remote Sensing*, 1999, Hong Kong, China, available at <http://www.gisdevelopment.net/aars/acrs/1999/ps3/ps3055pf.htm>
- Gairola S., Sharma C.M., Ghildiyal S.K., Suyal S., 2011. Live tree biomass and carbon variation along an altitudinal gradient in moist temperate valley slopes of the Garhwal Himalaya (India). *Current Science* 100, 1862-1870.
- Gamboa, O.M., and Montoya, A.M., 1992. A forest breeding program as part of a rural development strategy. In: "Resolving tropical forest resource concerns through tree improvement, gene conservation and domestication of new species". *UIFRO conference S2.02-08*. Colombia.
- Gamon, J.A., 2008. Hyperspectral Remote Sensing of Canopy chemistry, Physiology, and biodiversity in Tropical Rain Forests. *Hyperspectral remote sensing of tropical and sub-tropical forest*. Kalascska, M., Arturo Sanchez-Azofeifa, G., (Ed). pp.297-303 (CRC press Taylor and Francis group)
- Gamon, J. A., Pen˜uelas, J., Field, C.B., 1992. A narrow-waveband spectral index that tracks diurnal changes in photosynthetic efficiency. *Remote Sensing of Environment* 41, 35-44.
- Ganguly, S., Schull, M.A., Samanta, A., Shabanov, N.V., Milesi, M., Nemani, R.R., Knyazikhin, Y., Myneni, R.,B., 2008. Generating vegetation leaf area index Earth system data record from multiple sensors. Part 2: Implementation, analysis and validation. *Remote Sensing of Environment* 112, 4318-4332.
- Gao, B.C., 1996. NDWI—A normalized difference for remote sensing of vegetation liquid water from space. *Remote Sensing of Environment* 58, 257-266.
- Gao, B.C., Heidebrecht, K. B., Goetz, A. F. H., 1992, Software for the derivation of scaled surface reflectance from AVIRIS Data. *Summaries of the Third annual JPL airborne geoscience workshop; Volume 1 AVIRIS workshop*.

- Gao, B.C., Heidebrecht, K.B., Goetz, A.F.H., 1993, Derivation of scaled surface reflectance from AVIRIS data. *Remote Sensing of Environment* 44, 165-178.
- Gao, B., and Goetz, F.H., 1990. Column atmospheric water vapor and vegetation liquid water retrievals from airborne imaging spectrometer data. *Journal of Geophysical Research* 95, 3549-3564.
- Gausman, H.W., 1985. Plant leaf optical properties in visible and near-infrared light, in *Graduate studies no. 2*, Lubbock, TX.
- Geladi, P., and Kowalski, B.R., 1986. Partial least-squares regression: a tutorial. *Analytica Chimica Acta* 185, 1-17.
- Ghiyamat A., Shafria H.Z.M., 2010. A review on hyperspectral remote sensing for homogeneous and heterogeneous forest biodiversity assessment. *International Journal of Remote Sensing* 31, 1837-1856.
- Gitelson A.A., and Merzlyak M.N., 1997. Remote estimation of chlorophyll content in higher plant leaves. *International Journal of Remote Sensing* 18, 2691-2697.
- Gitelson, A.A., and Merzylac, M.N., 1994. Spectral reflectance changes associated with autumn senescence of *Aesculus hippocastanum* L. and *Acer platanoides* L. leaves. Spectral features and relation to chlorophyll estimation. *Journal of Plant Physiology* 143, 286-292.
- Gitelson, A.A., Kaufman, Y.J., Merzlyak, M.N., 1996. Use of a green channel in remote sensing of global vegetation from EOS-MODIS. *Remote Sensing of Environment* 58, 289-298.
- Goetz, A., 2002, Relative performance of HATCH and three other techniques for atmospheric correction of Hyperion and AVIRIS data: EO-1 Science Validation Meeting.
- Goetz, A.F.H., Vane, G., Solomon, J.E., Rock, B.N., 1985. Imaging spectrometry for earth remote sensing. *Science* 228, 1147.
- Gómez J.A., Zarco-Tejada P.J., García-Morillo J., Gama, J., Soriano A. M., 2011. Determining Biophysical Parameters for Olive Trees Using CASI-Airborne and Quickbird-Satellite Imagery. *Agronomy Journal* 103, 644-654.
- Gong, P., Pu, R., Miller, J.R., 1992. Correlating leaf area index of ponderosa pine with hyperspectral CASI data. *Canadian Journal of Remote Sensing* 18, 275-282.
- Goodenough, D.G., Li, J.Y., Asner G.P., Michael, E.S., Ustin, S.L., Dyk A., 2006. Combining hyperspectral remote sensing and physical modeling for applications in

land ecosystems IEEE Transactions on Geoscience and Remote Sensing 41, 1332-1337.

- Granier, A., Ceschia, E., Damesin, C., Dufrene, E., Epron, D., Gross, P et al., 2000. The carbon balance of a young beech forest. *Functional Ecology* 14, 312-325.
- Green, D.S., Erickson, J.E., Kruger, E. L., 2003. Foliar morphology and canopy nitrogenas predictors of light-use efficiency in terrestrial vegetation. *Agricultural and Forest Meteorology* 115, 163-171.
- Green, P.E., Carroll, J.D., 1978. *Analyzing Multivariate Data*, Illinois: The Dryden Press.
- Green, R.O., M.L., Eastwood, C.M., Sarture, T.G., Chrien, M., Aronsson, Chippendale, B.J., Faust, J.A., Pauri, B.E., Chovit, C.J., Solis, M., Olah M.R., Williams, O., 1998. Imaging spectroscopyand the Airborne Visible/Infrared Imaging Spectrometer (AVIRIS). *Remote Sensing of Environment* 65, 227-248.
- Grossman, Y.L., Ustin, S.L., Jacquemoud, S., Sanderson, E.W., Schmuck G., Verdebout, J., 1996. Critique of stepwise multiple linear regression for the extraction of leaf biochemistry information from leaf reflectance data. *Remote Sensing of Environment* 56, 1-12.
- Guyot, G., and Baret, F., 1988. Utilisation de la haute resolution spectrale pour suivre l'etat des couverts vegetaux (Utilisation of the high spectral resolution to follow the status of the covered vegetation). In: *Proceedings ofthe Fourth International Colloquium on Spectral Signatures of Objects in Remote Sensing*, (pp. 279–286), Aussois, France, January 18–22, Paris.
- Guyot, G., 1990. Optical properties of vegetation canopies. Applications of remote sensing in agriculture. Steven, M.D., Clark, J.A. (Ed.) pp.19-43(London. Butterworths).
- Haaland, D.M., and Thomas, E.V., 1988, Partial least-squares methods for spectral analyses. 1. Relation to other quantitative calibration methods and the extraction of qualitative information. *Analytical Chemistry*, 60.
- Haboudane, D., Miller, J.R., Tremblay, N., Zarco-Tejada, P.J., and Dextraze, L., 2002. Integrated narrow-band vegetation indices for prediction ofcrop chlorophyll content for application to precision agriculture. *RemoteSensing of Environment* 81, 416-426.

- Haboudane, D., Millera, J.R., Patteyc, E., Zarco-Tejadad, P.J., Strachan, I.b., 2004. Hyperspectral vegetation indices and novel algorithms for predicting green LAI of crop canopies: Modeling and validation in the context of precision agriculture, *Remote Sensing of Environment* 90, 337-352
- Haboudane, D., Tremlay, N., Miller, J.R., Vigneault, P., 2008. Remote estimation of crop chlorophyll content using spectral indices derived from Hyperspectral data. *IEEE Transactions on Geosciences and Remote sensing* 46, 423-437.
- Hansen, P.M., and Schjoerring, J.K., 2003. Reflectance measurement of canopy biomass and nitrogen status in wheat crops using normalized difference vegetation indices and partial least squares regression. *Remote Sensing of Environment* 86, 542-553.
- Harahap, R.N. and Soerianegara, I., 1977. Heritability of some characters in Teak. In: *Proceedings from the Third World consultation on forest tree breeding*. Vol. 2, IUFRO/CRO, Canberra.
- Hardisky, M.A., Klemas, V., Smart, R.M., 1983. The influences of soil salinity, growthform, and leaf moisture on the spectral reflectance of *Spartina alterniflora* canopies. *Photogrammetric Engineering and Remote Sensing* 49, 77-83.
- Hinzman, L.D., Bauer, M.E., Daughtry, C.S.T., 1986. Effects of nitrogen fertilization on growth and reflectance characteristics of winter wheat. *Remote Sensing of Environment* 19, 47-61.
- Hoffman, D.L., and Simmons, A., 2008. *The Resilient Earth: Science, Global Warming and the Fate of Humanity*. (book surge Publishing, USA).
- Holdridge, L.R., 1967. *Life zone ecology*. San Jose, Costa Rica: Tropical Science Center.
- Hope, A.S., 1995. Monitoring ecosystem response to global change: high spatial resolution digital imagery. In: J. M. Moreno, and W. C. Oechel (Eds.), *Global change and Mediterranean-type ecosystems*, *Ecological Studies*, 117 (pp. 239-253). New York: Springer-Verlag.
- Horler, D.N.H., Dockray, M., and Barber, J., 1983. The red edge of plant leaf reflectance. *International Journal of Remote Sensing* 4, 273-288.
- Houghton, R.A., J.L. Hackler, and Lawrence, K.T., 2000. Changes in terrestrial carbon storage in the United States. 2. The role of fire and fire management, *Global Ecology and Biogeography* 9, 145-170.

- Houghton, R.A., 2005. Aboveground forest biomass and the global carbon balance. *Global Change Biology* 11, 945-958.
- Htun, N., and Kaufmann C.M., 1980. Tree improvement in Burma. Forest research institute, Yezin, Myanmar. Technical document No 4/80-81.
- Huang, Z., Turner, B.J., Dury, S.J., Wallis, I.R., Foley, W.J., 2004. Estimating foliage nitrogen concentration from HYMAP data using continuum removal analysis. *Remote Sensing of Environment* 93, 18-29.
- Huber, S., Kneubuhler, M., Psomas, A., Litten, K., Zimmermann, N E., 2008. Estimating foliar biochemistry from hyperspectral data in mixed forest canopy. *Forest Ecology and Management* 256, 491-501.
- Huete, A.R., 1988. A soil-adjusted vegetation index (SAVI). *Remote Sensing of Environment* 25, 295-309.
- Huete, A.R., Kim, Y., Ratana, P., Didan, K., Shimabukuro, Y.E., Miura, T., 2008. Spectral expression of gender: A pilot study with two neotropical tree species. *Hyperspectral remote sensing of tropical and sub-tropical forest*. Kalascska, M., Arturo Sanchez-Azofeifa, G., (Ed). Pp.233-260 (CRC press Taylor and Francis group).
- Huete, A.R., Liu, H.Q., Batchily, K., Leeuwen, W.V., 1997. Comparison of vegetation indices over a global set of TM images for EOS-MODIS. *Remote Sensing of Environment* 59, 440-451.
- Hunt, E.R., Rock, B.N., Nobel, P.S., 1987. Measurement of leaf relative water content by infrared reflectance. *Remote Sensing of Environment* 22, 429-435.
- Indonesia Forest State Enterprise 1993: Teak in Indonesia. In: *Teak in Asia* (edited by H. Wood). FORSPA publication 4, GCP/RAS/I34/ASB. Bangkok. Thailand.
- Jacquemoud, S., and Baret, F., 1990. PROSPECT: a model of leaf optical properties spectra. *Remote sensing of Environment* 34, 75-91.
- Jacquemoud, S., Ustin, S.L., Verdebout, J., Schmuck, G., Andreoli G., Hosgood, B., 1996. Estimating leaf biochemistry using the PROSPECT leaf optical properties model. *Remote Sensing of Environment* 56, 194-202.
- Jago, R.A., Cutler, M.E.J., Curran P.J., 1999. Estimating canopy chlorophyll concentration from field and airborne spectra. *Remote Sensing of Environment* 68, 217-224.

- Jain, N., Ray, S.S., Singh, J.P. Panigrahy, S., 2007. Use of hyperspectral data to assess the effects of different nitrogen applications on a potato crop. *Precision Agriculture* 8, 225-239.
- Jakubauskas, M.E., and Price, K.E., 1997. Empirical relationships between structural and spectral factors of Yellowstone Lodgepole pine forests. *Photogrammetric Engineering and Remote Sensing* 63, 1375-1381.
- Jaykumar, S., Arockiasamy, D.I., Britto, J.S., 2002. Conserving forests in the Eastern Ghats through remote sensing and GIS - A case study in Kolli hills. *Current Science* 82, 1259-1266.
- Jensen, J.R., 2000. Remote sensing of the environment: an earth resource perspective. Prentice-Hall, Upper Saddle River, New Jersey, USA.
- Jensen, J.R., 1996. Introductory digital image processing: A Remote Sensing Perspective, 2nd ed. Prentice-Hall, New Jersey, 1-318.
- Johnson, L.F. and Billow, C.R., 1996. Spectroradiometric estimation of total nitrogen concentration in Douglas-fir foliage. *International Journal of Remote Sensing* 17, 489-500.
- Kalacska M., Sanchez-Azofeifa G.A., Rivard B., Caelli T., Peter White H, Calvo-Alvarado, J.C., 2007. Ecological fingerprinting of ecosystem succession: Estimating secondary tropical dry forest structure and diversity using imaging spectroscopy. *Remote Sensing of Environment* 108, 82-96.
- Kalacska M., Sanchez-Azofeifa G.A., Rivard B., Calvo-Alvarado, J.C., et al., 2004, Leaf area index measurements in a tropical moist forest: A case study from Costa Rica. *Remote Sensing of Environment* 91, 134-152.
- Kalacska, M., Sanchez-Azofeifa, Caelli, T., Rivard, B., Boerlage, B., 2005. Estimating leaf area index from satellite imagery using Bayesian networks. *IEEE Transactions on Geoscience and Remote Sensing* 43, 1866-1873.
- Kaosa-ard, A., 1993. Teak in Thailand. In: *Teak in Asia* (edited by H. Wood). FORSPA publication 4, GCP/RAS/I34/ASB. Bangkok. Thailand.
- Kaosa-ard, A., Suangtho, V. and Kjaer, E.D., 1998, Experience from 30 years of tree improvement of teak (*Tectona grandis*) in Thailand. Technical Note no 50. Danida Forest Seed Centre. Humlebæk. Denmark.

- Kaul, M., Mohren, G.M.J., Dadhwal, V.K., 2010, Carbon storage and sequestration potential of selected tree species in India. *Mitig Adapt Strateg Glob Change* 15, 489-510.
- Kavzoglu, T., and Mather, P.M., 2004. The use of backpropagating artificial neural networks in land cover classification. *International Journal of Remote Sensing* 24, 4907-4938.
- Keller, M., Palace, M. and Hurtt, G. 2001 Biomass estimation in the Tapajos National Forest, Brazil; examination of sampling and allometric uncertainties. *Forest Ecology and Management* 154, 371-382.
- Keogh, R. 1996: Teak 2000. Amazona Teak Foundation. Amsterdam. Netherlands.
- Kneizys, F.X., Shettle, E.P., Abreau, L.W., Chetwynd, J.H., Anderson, G.P., Gallery, W.O., Selby, E.A., And Clough, S.A., 1988, Users guide to LOWTRAN-7. In AFGL-TR-8-0177 Air Force Geophysics Laboratories (Bedford, Massachusetts, pp. 137-140).
- Knox, N.M., Skidmore, A.K. , Prins, H.H.T., Asner G.P., and Harald, M.A., et al., 2011. Dry season mapping of savanna forage quality, using the hyperspectral Carnegie Airborne Observatory sensor. *Remote Sensing of Environment* 115, 1478-1488.
- Kokaly R.F., Asner G.P., Ollinger S.V., Martin M.E., Wessman C.A., 2009. Characterizing canopy biochemistry from imaging spectroscopy and its application to ecosystem studies. *Remote Sensing of Environment* 113, 578-591.
- Kokaly, R.F., 2001. Investigating a physical basis for spectroscopic estimates of leaf nitrogen concentration. *Remote Sensing of Environment* 75, 153-161.
- Kokaly, R.F., and Clark, R.N., 1999. Spectroscopic determination of leaf biochemistry using band-depth analysis of absorption features and stepwise multiple linear regression. *Remote Sensing of Environment* 67, 267-287.
- Kokaly, R.F., Despain, D.G., Clark, R.N., Eric Livo, K., 2003. Mapping vegetation in Yellowstone National Park using spectral feature analysis of AVIRIS data. *Remote Sensing of Environment* 84, 437-456.
- Kruse, F.A., Lefkoff, A.B., Boardman, J. B., Heidebrecht, K. B., Shapiro, A. T., Barloon, P. J. Goetz, A. F. H., 1993. The Spectral Image Processing System (SIPS)-Interactive visualization and analysis of imaging spectrometer data. *Remote Sensing Environment* 44, 145-163

- Kubinyi, H., 1996. Evolutionary variable selection in regression and PLS analyses. *Journal of Chemometrics* 10, 119-133.
- Kumar, A., Marcot, B.G., Saxena, A., 2006 Tree species diversity and distribution patterns in tropical forests of Garo Hills. *Current Science* 91,1370-1380.
- Kumar, L., Schmidt, K.S., Dury, S., Skidmore, A.K., 2001. Review of hyperspectral remote sensing and vegetation science. In F. Van Der Meer (Ed.), *Hyperspectral remote sensing*. Dordrecht: Kluwer Academic Press.
- Kumaravelu, G., 1993: Teak in India. In: *Teak in Asia* (edited by H. Wood). FORSPA publication 4, GCP/RAS/I34/ASB. Bangkok. Thailand.
- Kurz, W.A., and Apps M.J., 1999. A 70-year retrospective analysis of carbon fluxes in the Canadian forest sector, *Ecol. Appl.* 9, 526-547.
- Lal, R., 2004. Soil Carbon Sequestration Impacts on Global Climate Change and Food Security. *Science* 304, 1623-1627.
- Landgrebe, D.A., 2003. *Signal Theory Methods in Multispectral Remote Sensing*, John Wiley and Sons.
- Lawrence, R., Bunn, A., Powell, S., Zmabon, M., 2004. Classification of remotely sensed imagery using stochastic gradient boosting as a refinement of classification treeanalysis. *Remote Sensing of Environment* 90, 331-336.
- le Maire, G., Francois, C., and Dufrene, E., 2004, Towards universal broad leaf chlorophyll indices using PROSPECT simulated database and hyperspectral reflectance measurements. *Remote sensing of environment* 89, 1-28.
- le Maire, G., Francois, C., Saoudani, K., Berveiller, D., Pontailier, J., Breda, N., genet, H., Davi, H., Dufrene, E., 2008. Calobration and validation of hyperspectral indices for the estimation of broadleaved forest leaf chlorophyll content, leaf biomass per area and leaf canopy biomass. *Remote sensing of Environment* 112, 3846-3864.
- Lee, K.S., Cohen, W.B., Kennedy, R.E., Maiersperger, T.K., Gower, S.T., 2004. Hyperspectral versus multispectral data for estimating leaf area index in four different biomes. *Remote Sensing of Environment* 91, 508-520.
- Lillesand, T.M., and Kiefer, R.W., 2000. *Remote sensing and image interpretation* (fourth edition). New York: John willey and sons, Inc.
- Linderman, M., Liu, J., Qi, J., An, L., Ouyang, Z., Yang, J., Tan., Y., 2004. Using artificial neural networks to map the spatial distribution of under storey bamboo from remote sensing data. *International Journal of Remote Sensing* 25, 1685-1700.

- Lu, A., Tian, H., Liu, Y., 2005. State-of-the-art in quantifying fire disturbance and ecosystem carbon cycle. *Acta Ecol. Sinica* 25, 2734-2743.
- Lucas, R., Bunting, P., Paterson., Chisholm, L., 2008. Classification of Australian forest communities using aerial photography, CASI and HyMap data. *Remote Sensing of Environment* 110, 2088- 2103.
- Lucas, R., Mitchell, A., Bunting., P., 2008, Spectral expression of gender: A pilot study with two neotropical tree species. *Hyperspectral remote sensing of tropical and sub-tropical forest*. Kalascska, M., Arturo Sanchez-Azofeifa, G., (Ed). pp.47-78 (CRC press Taylor and Francis group).
- Madoffé and Chamshama, 1989. Tree improvement in Tanzania. *Commonwealth Forestry Review* 68.
- Maddugoda, P., 1993. Teak in Sri Lanka. In: *Teak in Asia*, FORSPA Publication 4, Bangkok, 71–77.
- Madugundu, R., Nizalpur, V., Jha, C., 2008. Estimation of LAI and above-ground biomass in deciduous forests: Wersten Ghats of Karnataka, India. *International Journal of Applied Earth Observation* 10, 211-219.
- Magurran, A.E., 2004. *Measuring biological diversity*. Malden MA:Blackwell Science.
- Malhi, Y., and Grace, J., 2000. Tropical forests and atmospheric carbon dioxide. *Trends in Ecology and Evolution* 15, 332-337.
- Martens, H., 1989. *Multivariate Calibration*. New York: Wiley
- Martens, H., and Martens, M., 2000. Modified jack-knife estimation of parameter uncertainty in bilinear modeling by partial least squares regression (PLSR). *Food Quality and Preference* 11, 5-16.
- Martin, M.E., Aber, J.D., 1997. High spectral resolution remote sensing of forest canopy lignin, nitrogen, and ecosystem processes. *Ecological Applications* 7, 431-444.
- Martin, M.E., Newman, S.D., Aber, J.D., Congalton, R.G., 1998. Determining forest species composition using high spectral resolution remote sensing data. *Remote Sensing of Environment* 65, 249–254.
- Martin, M.E., Plourde, L.C., Ollinger, S.V., Smith, M.L., McNeil, B.V., 2008. A generalizable method for remote sensing of canopy nitrogen across a wide range of forest ecosystems. *Remote sensing of Environment* 112, 3511-3519.

- McMurtrey, J.E., Chappelle, E.W., Kim, M.S., Meisinger, J.J., Corp, L.A., 1994. Distinguishing nitrogen fertilization levels in fieldcorn (*Zea mays* L.) with actively induced fluorescence and passivereflectance measurements. *Remote Sensing of Environment* 47, 36-44.
- Melgani, F., Bruzzone, L., 2004. Classification of hyperspectral remote sensing images with support vector machines. *IEEE Transactions on Geoscience and Remote Sensing* 42, 1778-1790.
- Merh, S.S., 1995. geology of Gujarat, Geological society of India, Bangalore, 1-18
- Miller, C.J., 2002, Performance assessment of ACORN atmospheric correction algorithm: Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery VIII; Aerosense 2002. Orlando, FL: SPIE.
- Ministry of Environment and Forest, 2009. National Report " To the convention on Biological diversity ". 1-2.
- Mlodzinska, E., 2009. Survey of plant pigments: molecular and environmental determinants of plant colors. *Acta Biologica Cracoviensia - Series Botanica* 51, 7-16.
- Murphy, P.G., Lugo, A.E., 1986. Structure and biomass of a subtropical dry forest in Puerto Rico. *Biotropica* 18, 89-96.
- Mutanga, O., Skidmore, A.K., 2004. Narrow band vegetation indices overcome the saturation problem in biomass estimation. *International Journal of Remote Sensing* 25, 3999-4014.
- Mutanga, O., Skidmore, A.K., Kumar, L., Ferwerda, J., 2005. Estimating tropical pasture quality at canopy level using band depth analysis with continuum removal in the visible domain. *International Journal of Remote Sensing* 26, 1093-1108.
- Myers, N.R.A. Mittermeier, C.G., Mittermeier, G.A.B., Fonseca, D., Kent. J., 2000. Biodiversity hotspots for conservation priorities. *Nature*, 403, 853-858.
- National Bureau of Soil Survey and Land Use Planning (NBSS), 1994. Gujarat. Soils. Sheet 4.
- Nemani, R.R., Pierce, L.L., Running, S.W., Band, L.E., 1993. Forest ecosystem processes at the watershed scale: Sensitivity to remotely sensed leaf area index estimates. *International Journal of Remote Sensing* 14, 2519-2534.
- Nepstad, D.C., Moutinho, P., Dias, M.B., Davidson, E., Cardinot, G., Markewitz, D., et al., 2002. The effects of partial throughfall exclusion on canopy processes,

aboveground production, and biogeochemistry of an Amazon forest. *Journal of Geophysical Research* 107, 1-18.

- Nimachow, G., Rawat, J. S., and Dai O., 2010. Status of Himalayan yews in West Kameng district of Arunachal Pradesh. *Current science* 98,1434-1437
- Okin, G.S., Roberts, D.A., Murray, B., Okin, W.J., 2001. Practical limits on hyperspectral vegetation discrimination in arid and semiarid environments. *Remote Sensing of Environment* 77, 212- 225.
- Ollinger, S. V., 2011. Sources of variability in canopy reflectance and the convergent properties of plants *New Phytologist* 189, 375-394.
- Ollinger, S. V., and Smith, M. L. 2005. Net primary production and canopy nitrogen in a temperate forest landscape: An analysis using imaging spectroscopy, modeling, and field data. *Ecosystems* 8, 760–778.
- Ollinger, S.V., Smith, M.L., Martin, M.E., Hallett, R. A., Goodale, C.L., Aber, J.D., 2002. Regional variation in foliar chemistry and N cycling among forests of diverse history and composition. *Ecology* 83, 339–355.
- Opsahl, S., and R. Benner, 1997. Distribution and cycling of terrigenous dissolved organic matter in the ocean. *Nature* 386, 480- 482,
- Ourcival, J.M.R., Joffre, S., 1999. Exploring the relationships between reflectance and anatomical and biochemical properties in *Quercus ilex* leaves. *New Phytologist* 143, 351-364.
- Overman J.P.M., Witte, J.L., Saldarriaga J.G., 1994. Evaluation of Regression Models for Above-Ground Biomass Determination in Amazon Rainforest. *Journal of Tropical Ecology* 10, 207-218.
- Pal, M., Mather, P.M., 2003. An assessment of the effectiveness of decision tree methods for land cover classification. *Remote Sensing of Environment* 86,554-565.
- Palacios-Orueta, A.A., Chuvieco, P.E., and Carmona-Moreno C., 2004. Remote Sensing and geographic information systems methods for global spatiotemporal modeling of biomass burning emissions: An Assessment in the African continent, *Journal of Geophysical Research*, 109-117.
- Panigrahy, R.K., Kale, M.P., Dutta, U., Mishra, A., Banerjee, B., Singh, S., 2010. Forest cover change detection of Western Ghats of Maharashtra using satellite remote sensing based visual interpretation technique. *Current Science* 98, 658-664.

- Paola, J.D., and Schowengerdt, R.A., 1995. A review and analysis of back propagation neural networks for classification of remotely sensed multispectral imagery, *International Journal of Remote Sensing* 16, 3033-3058.
- Pearlman, J., Carman, S., Segal, C., Jarecke, P., Clancy, P., and. Brown, W., 2001. Overview of the Hyperion Imaging Spectrometer for the NASA EO-1 Mission 2001. IGARSS, pp. 3036-3038 (Sydney, Australia).
- Pen˜uelas J, Baret F, Filella I. 1995. Semi-empirical indices to assess carotenoids/chlorophyll a ratio from leaf spectral reflectance. *Photosynthetica* 31, 221-230.
- Pen˜uelas, J., Pin˜ol, J., Ogaya, R., and Filella, I., 1997. Estimation of plantwater concentration by the reflectance water index WI (R900/R970). *International Journal of Remote Sensing* 18, 2869- 2875.
- Pfaff, A.S.P., and Sanchez-Azofeifa, G.A., 2004. Deforestation pressure and biological reserve planning: a conceptual approach and an illustrative application for Costa Rica. *Resource and Energy Economics* 26, 237–254.
- Pfaff, A.S.P., Kerr, S., Hughes, R.F., Liu, S., Sanchez-Azofeifa, G.A., Schimel, D., et al., 2000. The Kyoto protocol and payments for tropical forests: An interdisciplinary method for estimating carbon-offset supply and increasing the feasibility of a carbon market under the CDM. *Ecological Economics* 35, 203–221.
- Plaza, A., Benediktsson, J.A., Boardman, J.W., Brazile, J., Bruzzone, L., Camps-Valls, G., Chanussot, J., Gamba, P., Fauvel, M., Gualtieri, A., Marconcini, M., yilton, J.C., Trianni, G., 2009. Recent advances in techniques for hyperspectral image processing. *Remote Sensing of Environment* 113, 110-122.
- Ponzani, F.J., Galv˜ao, L.S. Liesenberg, V., Santos, J.R., 2010. Impact of multi-angular CHRIS/PROBA data on their empirical relationships with tropical forest biomass. *International journal of remote sensing* 31, 5257-5273.
- Pradeepkumar, G., 1993. Vegetational and ecological studies of Shoolpaneshwar Wildlife Sanctuary. Ph D thesis, The M.S. University of Baroda, Vadodara.
- Qi, J, Chehbouni A., Huete A.R., Kerr Y.H., Sorroshian S., 1994. A Modified Soil Adjusted Vegetation Index. *Remote Sensing of Environment* 47, 1-25
- Qu, Z., Goetz, A.F.H., Heidebrecht, K.B., 2000, High-Accuracy Atmosphere Correction for Hyperspectral Data (HATCH). Summaries of the 9th Annual JPL

Airborne Earth Science Workshop, Jet Propulsion Laboratory Publication, Vol. 1
AVIRIS Workshop, Jet Propulsion Laboratory, California Institute of Technology
Pasadena, California.



- Rawat, T.S., Menaria, B.L, Dugaya D., Kotwal P.C., 2008. Sustainable forest management in India. Current science 94, 996-1002.
- Ray, S.S., Jain, N., Miglani, A., Singh, J.P., Singh, A.K., Panigrahy, S., Parihar, J.S., 2010. Defining optimum spectral narrow bands and bandwidths for agricultural applications. Current Science 98, 1365-1369.
- Reddy G.M., 2006. Clonal propagation of bamboo (*Dendrocalamus strictus*). Current Science 91, 1462-1464.
- Reich, P.B., Ellsworth, D.S., and Walters, M.B., 1998. Leaf structure (specific leaf area) modulates photosynthesis-nitrogen relations: Evidence from within and across species and functional groups. Functional Ecology 12, 948-958.
- Reich, P.B., Hobbie, S.E., Lee, T., Ellsworth, D.S., West, J.B., Tilman, D., et al., 2006. Nitrogen limitation constrains sustainability of ecosystem response to CO₂. Nature 440, 922-925.
- Roberts, D.A., Ustin, S.L., Ogunjemiyo, S., Greenberg, J., Dobrowski, S.Z., Chen, J., et al., 2004. Spectral and structural measures of northwest forest vegetation at leaf to landscape scale. Ecosystems 7, 545-562.
- Rogan, J., and Chen, D.M., 2004. Remote sensing technology for mapping and monitoring land-cover and land-use change. Progress in Planning 61, 301-325.
- Rondeaux, G, Steven M, Baret F, 1996. Optimization of Soil Adjusted Vegetation Indices. Remote Sensing of Environment 55, 95-107.
- Rosenqvist, A., Milne, A., Lucas, R., Imhoff, M., Dobson, C., 2003. A review of remote sensing technology in support of the Kyoto Protocol. Environmental Science and Policy 6, 441-455.
- Rougean, J.L., and Breon, F.M., 1995. Estimating PAR absorbed by vegetation from bidirectional reflectance measurements. Remote Sensing of Environment 51, 375-384.
- Sabnis, S.D., and Amin, J.C., 1992. Eco-Environmental studies of Sardar Sarovar Environs. The M.S.University of Baroda.

- Sagar, R. Raghubanshi, A.S. and Singh, J.S., 2003. Asymptotic models of species-area curve for measuring diversity of dry tropical forest tree species. *Current science* 84, 1555-1559.
- Sanchez-Azofeifa G.A., Quesada, M., Rodríguez, J. P., Nassar, J. M., Stoner K., E., Castillo, A., Garvin T et al., Zent, E. L., Calvo-Alvarado, J.C., Kalacska M., Laurie F., Cuevas-Reyes, P., 2005. Research Priorities for Neotropical Dry Forests. *Biotropica* 37, 477-485.
- Sánchez-Azofeifa, G.A., Castro, Rivard, K.L.B., Kalascka, M.R., 2003. Remote Sensing Research Priorities in Tropical Dry Forest Environments. *Biotropica* 35, 134-142.
- Schlerf, M., 2005. Determination of structural and chemical forest attributes using hyperspectral remote sensing data– Case studies in Norway spruce forests. (M.Sc Dissertation Thesis).
- Schlerf, M., Atzberger, C., Hill, J., 2005. Remote sensing of forest biophysical variables using HyMap imaging spectrometer data. *Remote Sensing of Environment* 95, 177-194.
- Schlerf, M., Atzberger, C., Hill, J., Buddenbaum, H., Werner, W., Schuler, G. 2010. Retrieval of chlorophyll and nitrogen in Norway spruce (*Picea abies* L. Karst.) using imaging spectroscopy. *International journal of earth observation and geoinformation* 12, 17-26.
- Schlerf, M., Atzberger, C., Vohland, M., Buddenbaum, H., Seeling, S. and Hill, J., 2004, Derivation of forest leaf area index from multi and hyperspectral remote sensing data. *EARSeL proceedings*, 3, 405-413.
- Schmidtlein, S., Sassan, J., 2004. Mapping of continuous floristic gradients in grasslands using hyperspectral imagery. *Remote Sensing of Environment* 92, 126-138.
- Serrano, L., Penuelas, J., Ustin, S.L., 2002. Remote sensing of nitrogen and lignin in Mediterranean vegetation from AVIRIS data: Decomposing biochemical from structural signals. *Remote Sensing of Environment* 81, 355–364.
- Serrano, L., Ustin, S.L., Roberts, D.A., Gamon, J.A., and Penuelas, J., 2000. Deriving water content of chaparral vegetation from AVIRIS data. *Remote Sensing of Environment* 74, 570- 681.

- Shafri, H.Z.M., Suhaili, A., Mansor, S., 2007. The Performance of Maximum Likelihood, Spectral Angle Mapper, Neural Network and Decision Tree Classifiers in Hyperspectral Image Analysis. *Journal of Computer Science* 3, 419-423.
- Shi H, and Singh A., 2002. An assessment of biodiversity hotspots using Remote Sensing and GIS. *Journal of the Indian Society of Remote Sensing* 30, 105-112.
- Shippert, P., 1992. Introduction to hyperspectral image analysis. Ph.D thesis (University of Auckland).
- Sims, D.A., and Gamon, J.A., 2002. Relationships between leaf pigment content and spectral reflectance across a wide range of species, leaf structures and developmental stages. *Remote Sensing of Environment* 81, 337-354.
- Sims, D.A., Gamon, J.A., 2003. Estimation of vegetation water content and photosynthetic tissue area from spectral reflectance: A comparison of indices based on liquid water and chlorophyll absorption features. *Remote Sensing of Environment* 84, 526-537.
- Singh, L., Sharma, B., Agrawal, R., Puri, S., 2005. Diversity And Dominance of a Tropical Moist Deciduous forest In Achanakmar Wildlife Sanctuary. *Bulletin of the National Institute of Ecology* 15, 1-9.
- Singh, M.P., Singh, J.K., Mohanka R., 2007. Forest Environment and Biodiversity, pp. 425- 430 (Divya publishing house, New Delhi)
- Slaton, M.R., Hunt, E.R., And Smith., W.K., 2001. Estimating near infrared leaf reflectance from leaf structural characteristics. *American Journal of Botany* 88, 278-284.
- Smith, M. O., Ustin, S. L., Adams, J. B., and Gillespie, A. R., 1990. Vegetation in deserts: I. A regional measure of abundance from multispectral images. *Remote Sensing of Environment* 31, 1 – 26.
- Smith, J.A., Seo, D.J., Baeck, M.L., Hudlow, M.D., 1996. Intercomparison study of NEXRAD precipitation estimates, *Water Resource Research*, 32, 2035-2045.
- Smith, M.L., Martin, M.E., Plourde, L., Ollinger, S.V. 2003. Analysis of hyperspectral data for estimation of temperate forest canopy nitrogen concentration: Comparison between an airborne (AVIRIS) and a spaceborne (Hyperion) sensor. *IEEE Transactions on Geoscience and Remote Sensing* 41, 1332-1337.

- Smith, M.L., Ollinger, S.V., Martin, M.E., Aber, J.D., Hallett, R.A., Goodale, C. L. 2002. Direct estimation of aboveground forest productivity through hyperspectral remote sensing of canopy nitrogen. *Ecological Applications* 12, 1286–1302.
- Smith, R.B., 2001. Introduction to hyperspectral imaging. [www. microimages.com](http://www.microimages.com)
- Soudani, K., Francois, C., Maire, H., Dantec, V., Dufrene, E., 2006. Comparative analysis of IKONOS, SPOT and ETM+ data for leaf area index estimation in temperate coniferous and deciduous forest stands. *Remote sensing of Environment* 102, 161-175.
- Spanner, M.A., Pierce, L.L., Peterson, D.L., and Running, S.W., 1990. Remote sensing of temperate coniferous forest leaf area index: The influence of canopy closure, understory vegetation and background reflectance. *International Journal of Remote Sensing* 11, 95-111.
- Stagakis, S., Markos, N., Sykioti, O., Kyparissis, A., 2010. Monitoring canopy biophysical and biochemical parameters in ecosystem scale using satellite hyperspectral imagery: An application on a *Phlomis fruticosa* Mediterranean ecosystem using multiangular CHRIS/PROBA observations. *Remote Sensing of Environment*, 114, 977–994.
- Subramanian, K.N., Nicodemus, A. and Radhamani, A. 1994. Teak improvement in India. *Forest Genetic Resources* 22, 33-36.
- Sykioti, O., Paronis., D., Stagakis S., Kypariss, A., 2011. Band depth analysis of CHRIS/PROBA data for the study of a Mediterranean natural ecosystem. Correlation with leaf optical properties of ecophysiological parameters. *Remote Sensing of Environment* 115. 752-766.
- Thenkabail, P.S., Enclona, E.A., Ashton, M.S., Meer, B.V.D., 2004. Accuracy assessments of hyperspectral waveband performance for vegetation analysis applications. *Remote Sensing of Environment* 91, 354-376.
- Thenkabail, P.S., 2002. Optimal hyperspectral narrowbands for discriminating agricultural crops. *Remote Sensing Reviews* 20, 257- 291.
- Thomas, E.V., Haaland, D.M., 1990. Comparison of multivariate calibration methods for quantitative spectral analysis. *Analytical Chemistry* 62, 1091-1099.
- Thomas, J.R., Namken L.N., Oerther, G.F., and Brown, R.G., 1971. Estimating leaf water content by reflectance measurements. *Agronomy Journal* 63, 845.847.

- UNFCCC, 2001. Report of the Conference of the Parties on the Second Part of its Sixth Session held at Bonn from 16 to 27 July 2001 (COP6, Part 2), FCCC/CP/2001/5 (Annex, Section VII).
- Ungar, S.G., 2002, Overview of the Earth Observing One (EO-1) Mission, 2002 IGARSS, pp. 568-571, (Toronto).
- USGS, 2010. Earth Observing (EO-1) USGS home page. URL: <http://eo1.usgs.gov>
- USGS, 2011. National Aeronautics and Space Administration (NASA) URL: <http://www.nasa.gov>
- Ustin, S.L., Roberts, D.R, Gamon, J.A, Asner, G. P., Green, R.O., 2004. Using Imaging Spectroscopy to Study ecosystem Processes and Properties. *BioScience* 54, 523-534.
- Ustin, S.L., Wessman, C.A., Curtiss, B., Kasischke, E., Way, J.B., Vanderbilt, V.C., 1991. Opportunities for using the EOS imagingspectrometers and synthetic aperture radar in ecological models. *Ecology* 72, 1934- 1945.
- Ustin, S.L., Roberts, D.A., Jacquemoud, S., Pinzón J., Gardner, M., Scheer G.J., Castaneda, C.M., Palacios A., 1998. Estimating canopy water content of chaparral shrubs using optical methods. *Remote Sensing of Environment* 65, 280-291.
- Van Aardt, J.A.N. Wynne, R.H., 2001. Spectral separability among six southern tree species. *Photogrammetric Engineering and Remote Sensing* 67, 1367-1375.
- Van Dijk, A., Bruijnzeel, L.A., 2001. Modeling rainfall interception by vegetation of variable density using an adopted analytical method: Part 1. Model description, *Journal of Hydrology* 35, 79-93.
- Vapnik, V., 1995. *The Nature of Statistical Learning Theory*. Springer-Verlag, New York.
- Vargas, L.A., Anderson, M.N., Jenson, C.R., Jorgensen, U., 2002. Estimation of Leaf Area Index, Light interception and biomass accumulation of *Miscanthus sinensis* 'Goliath' from radiation measurements. *Biomass and Bioenergy* 22, 1-14.
- Verdebout, J., Jacquemoud, S., Schmuck, G., 1994. Optical properties of leaves: Modeling and experimental studies. In: Hill, J., Megier, J. (Eds.): *Imaging spectrometry - a tool for environmental observations*. Dordrecht. Kluwer Academic Publishers, 169-191.

- Verstraete, M., Pinty, B., Myneni, R., 1996. Potential and limitations of information extraction on the terrestrial biosphere from satellite remote sensing. *Remote Sensing of Environment*, 58, 201- 214.
- Viscarra Rossel, R.A., 2005. ParLeS., Pre-processing of data, Principal Component Analysis and Partial Least Squares Regression with Leave-one-out Cross Validation. <http://www.usyd.edu.au/su/gric/acpa/people/rvrossel/soft01.htm>.
- Vogelmann, J.E., and Martin, G., 1993. The functional significance of palisade tissue: penetration of directional versus diffuse light. *Plant, Cell and Environment* 16, 65-72.
- Vogelmann, J.E., Rock, B.N., and Moss, D.M., 1993. Red edge spectral measurements from sugar maple leaves. *International Journal of Remote Sensing*, 14, 1563-1575.
- Vyas, D., Christian, B., Krishnayya, N.S.R., 2012. Canopy level estimations of chlorophyll and LAI for two tropical species (Teak and Bamboo) from Hyperion (EO1) data. *International Journal of Remote Sensing* (Accepted).
- Vyas, D., Krishnayya N.S.R., Manjunath K.R., Ray S.S., Panigrahy S., 2011. Evaluation of classifiers for processing Hyperion (EO-1) data of tropical vegetation. *International Journal of Applied Earth Observation and Geoinformation* 13, 228-235.
- Vyas, D., Mehta, M., Dinakaran J., Krishnayya, N.S.R., 2010. Allometric equations for estimating leaf area index (LAI) of two important tropical species (*Tectona grandis* and *Dendrocalamus strictus*). *Journal of Forestry Research* 21, 97-200.
- Watson, R., Noble, I., Bolin, B., 2000, 'Summary for policy makers', in Intergovernmental Panel on Climate Change (IPCC), Special report on land use, land-use change, and forestry (LULUCF). Cambridge University Press.
- Weeks, P.J.D. and K.J. Gaston, 1997. Image analysis, neural networks and the taxonomic impediment to biodiversity studies. *Biodiversity and Conservation*, 6: 263-274.
- Weiss, M., and Baret, F., 1999. Evaluation of canopy biophysical variable retrieval performances from the accumulation of large swath satellite data. *Remote Sensing of Environment* 70, 293-306.
- Williamson, G.B., Laurance, W.F., Oliveira, A.A., Delamonica, P., Gascon, C., Lovejoy, T.E., et al., 2000. Amazonian tree mortality during El Niño drought. *Conservation Biology* 14, 1538-1542.

- Wold H., 1975. Path models with latent variables: the NIPALS approach. In: Blalock HM (ed). Quantitative Sociology: International Perspectives on Mathematical and Statistical Model Building. New York: Academic Press.
- Wold S., 2001. Personal memories of the early PLS development. Chemom Intell Lab Syst 58, 83-90.
- Wolter, P.T., Townsend P.A., Sturtevant B.R., 2009. Estimation of forest structural parameters using 5 and 10 meter SPOT-5 satellite data. Remote Sensing of Environment 113, 2019-2036.
- Wu, C., Han, X., Niu, Z., Dong, J., 2010, An evaluation of EO-1 hyperspectral Hyperion data for chlorophyll content and leaf area index estimation. International Journal of Remote Sensing 31, 1079-1076.
- Yang, W., Tan, B., Huang, D., Rautiainen, M., Shabanov, N.V., Wang, Y., Privette, J.L., Huemmrich, K.F., Fensholt, R., Sandholt, I., Weiss, M., Ahl, D.E., Gower, S.T., Nemani, R.R., Knyazikhin, Y., Myneni, R.B., 2006. MODIS Leaf Area Index Products: From Validation to Algorithm Improvement. IEEE Transactions on Geosciences and Remote sensing 44, 1885-1898.
- Yilmaz, M.T., Hunt, E.R., Goins, L. D., Ustin, S.L., Vanderbilt, V.C., Jackson, T.J., 2008. Vegetation water content during SMEX04 from ground data and Landsat5 Thematic Mapper imagery. Remote Sensing of Environment 112, 350-362.
- Zagolski, F.V., Pinel, J., Romier, D., Alcayde, J., Fontanari, J.P., Gastellu-Etchegorry, G., Giordana, G., Marty, E. Mougin and R. Joffre, 1996. Forest chemistry with high spectral resolution remote sensing. International Journal of Remote Sensing 17, 1107-1128.
- Zarco-Tejada, P.J., Miller, J.R., Morales, A., Berjon, A., Agura, J., 2004. Hyperspectral indices and model simulation for chlorophyll estimation in open-canopy tree crops. Remote Sensing of Environment 90, 463-476.
- Zarco-Tejada, P.J., Miller J.R., Mohammed G. H., Noland T. L., Sampson P. H., 2001. Scaling-up and model inversion method with narrow-band optical indices for chlorophyll content estimation in closed forest canopies with hyperspectral data. IEEE Transactions on Geosciences and Remote sensing 39, 1491-1507.
- Zeng, N.H. Qian, Munoz, E., and Iacono, R., 2004: How strong is carbon cycle-climate feedback under global warming? Geophysical Research Letters 31, 1-5.

- Zhang, J., Rivard, B., Sanchez-Azofeifa, G.A., 2006. Intra- and interclass spectral Variability of tropical tree species at La Selva, Costa Rica: Implications for species identification using HYDICE imagery. *Remote Sensing of Environment* 105, 129-141.
- Zhao, D., Huang, L., Li, J., Qi, J., 2007, A comparative analysis of broadband and narrowband derived vegetation indices in predicting LAI and CCD of a cotton canopy, *ISPRS Journal of Photogrammetry and Remote Sensing* 62, 25-33.