ent incidence and azimuth angles, while several oceanographic and meteorological buoys measured SSS, SST, wind speed and direction, significant wave height (SWH) and period, and wave spectrum. Radiometer measurements were performed at different elevation angles from 25 to 65 to emulate the performance of SMOS, since the two-dimensional imaging capability of MIRAS will allow the observation of pixels in a wide range of incidence angles. This is a unique characteristic of this data set to study SSS retrievals and to test several theoretical electromagnetic L-band emissivity models.

EuroSTARRS was an airborne campaign also organized by ESA in November 2001 as part of the
SMOS preparatory studies [8]. An L-band V-polarized multi-angular radiometer of different technology was flown over the same oil platform area in coincidence with WISE 2001.

Based in those datasets, several emissivity and roughness models have been tested, as well as new semi-empirical models have been developed. Camps et al. [7] model described the emissivity due to roughness by the local wind state, while Gabarro et al. [9], described the variability of Tb depending on the local wind but also on sea wave height which take in account the swell effect.

Several emissivity models for flat sea have been analysed, even some of them present very similar behavior, Klein and Swift model [3] is the one selected to be used in the SMOS processing chain.

3. Prototype development
Since 2006, the SMOS Salinity Level 2 prototype processor is in development, lead by the company ACRI and with LOCEAN, IFREMER and ICM as scientific team.

The salinity retrieval algorithm developed is based on an iterative convergence approach that minimize the difference between SMOS Tb measured and those predicted by the full forward model. It includes the modeling of the ocean surface emissivity (depending on sea state, sea surface temperature, and viewing angle), the atmospheric effects, the contamination by sky radiation and the sun glint. A Bayesian approach is considered, which proposes to use some a priori information on the auxiliary variables (like wind speed, wave height and temperature) in addition to the radiometric measurements. These auxiliary parameters are obtained from the European Center for Medium Range Weather Forecasting (ECMWF) output models.

This prototype will be a test tool that should permit to test the algorithms, the thresholds values, the forward models, and the measurement discrimination scheme once the satellite will be fying.

The Spanish company GMV has started to code the Level 2 operational processor for salinity retrieval, based on the prototype, that will be installed in the SMOS ground segment, located in Villafranca del Castillo (Madrid, Spain).

4. Conclusions
SMOS is scheduled to be launch by autum 2008. This will be the first time that a satellite is dedicated to measure Soil Moisture and Ocean Salinity. The payload is an L-band synthetic aperture radiometer (MIRAS) that will measure brightness temperature, which is sensible to salinity. However, other factors influence the Tb measurements, as the surface temperature and the sea state. These parameters should be known with quite good precision to retrieve salinity with good quality.

Salinity is expected to be retrieved with a precision of 0.1 psu after averaging in time and space, and with a quality of 1 psu for the individual measurements.

Several campaigns have been performed to improve the modelling knowledge of Tb in several conditions.

A prototype processor is in development and it will be used in the Cal/Val phase to test the different algorithms

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EEL SILVERING STAGE BASED ON PLS CLASSIFICATION

F. Capoccioni (1), C. Costa (1-2), P. Menesatti (2), E. Ciccotti (1)

(1) University of Rome Tor Vergata, Dept. Biology, Via della Ricerca Scientifica – 00188 Roma – ITALY Tel: ++39-06-7259-5972 e-mail: buscaglione@fastwebnet.it
(2) Agritech Lab CRA-I.S.M.A. Via della Pascolare, 16 - 00016 Monterotondo (Roma) – ITALY

1. Introduction
European eel (Anguilla anguilla L., 1758) is a highly migratory catadromous species. The last transformation of its lifecycle (i.e. from yellow to silver; the "silvering") is a crucial event preparing the future spawners for the oceanic reproductive migration and sexual maturation. Silvering process can be characterized by several parameters like change of colour of the livery (Pankhurst and Lythgoe 1982 [1]), the increase in eye diameter (Pankhurst 1982 [2], Pankhurst and Lythgoe 1983 [3]), an increase of liver weight, and finally, a regression of the alimentary tract partly related to natural starvation and cessation of body growth (Sorensen and Pankhurst, 1988 [4]).

The aim of this study is to verify if discrimination of eel developmental stage on the basis of body colour, widely used in current practices and hence referred to in most management documents, can be a correct and simple method to determine whether an eel is immature and sedentary, preparing its metamorphosis or it is about to migrate.

2. Results and Discussion
Partial least squared analysis (PLS) has been used to develop a model explaining the co-variation between several parameters collected from 454 individuals of A. anguilla sampled in the lower stretch of the River Tiber in 2006, and the developmental stage assigned on

the basis of body colour (yellow eel, silver eel and intermediate). The whole sample (on which total length, weight, pectoral fin length, vertical and horizontal eye diameter was measured) has been randomly split into a model sample and a test sample representing 50% each of the dataset. A subsample of 229 individuals has been also sacrificed in order to determine liver and gut weights and to collect otholits for the age evaluation. A good discriminant model was obtained for both datasets: the first analysis, using five variables, shows a correct classification of 78 %, the latter, with eight input variables, 79,8 %.

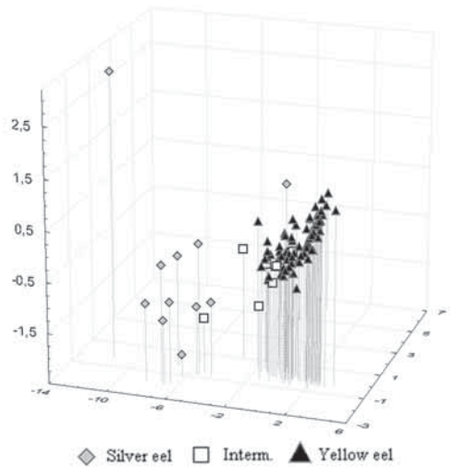

Figure 1. Ordination pattern of test sample. LVs are latent vectors with their variance.

Each sample has been represented using three latent variables, explaining 98,3 % and 94,3% of total variance for the whole sample and subsample, respectively.

3. Conclusions

A comprehensible and easy classification of silvering stages is of importance for field studies and it is therefore a useful tool when conservation and management strategies need to be defined.
This study confirms that a classification on the basis of body colour is a simple and reliable method to characterize European eel stages. Moreover this model obtains a good percentage of classification, based only on the use of external parameters, hence avoiding animal sacrifice.

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LOW COMPLEX OFDM-CDMA BASED WIRELESS SENSOR NETWORK IN THE HF BAND: DOWNLINK

P. Marti-Puig, M. Serra, R. Reig-Bolano

Codesign HW/SW Group, C/ de Laura, 13, 08500 Vic, Barcelona, Spain.
(+34)938861222 pere.marti@uvic.cat, moises.serra@uvic.cat, ramon.reig@uvic.cat

1. Introduction

An OFDM-CDMA (Orthogonal Frequency Division Multiplexing - Code Division Multiple Access) based system proposal working in the HF (High Frequency) band is presented for a downlink channel. The system could be developed to fit into WSNs (Wireless Sensor Networks). We rather propose a prototype; a further is required to perfectly define all parameters. There are different reasons to develop a new digital communication environment that can be integrated in a WSN. In a WSN having a node working as a BS (Base Station), this node should These nodes will be called MS (Mobile Setation) even if they are not in mobile.

The first reason to develop this project is that modern communication systems digitally implement not only low-pass signals but also IF (Intermediate Frequency) signals. Very fast and low-cost AD/DA (Analog-to-Digital / Digitalto- Analog) converters exist in the market that can sample the HF band. We realize that, in the HF band, one can digitally construct signal to directly connect the amplifier from the DA.
Digital technology can be applied to constructing almost all HD transceivers, and the RF (Radio Frequency) subsystem is reduced to an amplifier and an antenna. In the HF band one can digitally do filters, rough synchronization, base band conversion, fine synchronization, channel equalization, demodulation and decoding processes. Modern FPFA (Field Programmable Gate Arrays) provide hardware resources to build the transceivers.

The HF band provides very good propagation conditions. In this band, space losses are lower than in higher bands. The diffraction dominating in this band usually extends the area to cover beyond the direct light of signal.

This paper is one of two papers and it deals with a downlink strategy. or Sensor Network Topologies having a central node working as a BS, we propose the OFDM-CDMA modulation. BSs can usually work without hard power limitations. Since the OFDM-CDMA transmits a continuous flow of data, the BS can insert known data to help the nodes to extract time and frequency references for synchronization and for channel equalization.

The first works combining OFDM with different multiple access techniques appeared in 1993 [1-5].The OFDM-DCMA was one of these approaches. The use of OFDM-DCMA in the HF band was applied in [6]. Our approach combines the OFDM-CDMA in the in the downlink and an OFDM-TDMA burst system in the uplink for obtaining low cost transceivers, especially for MSs nodes. We look for simplicity and low-cost implementations.

Figure 1 represents data from the BS to the MS (or sensor nodes) in time and frequency axes.

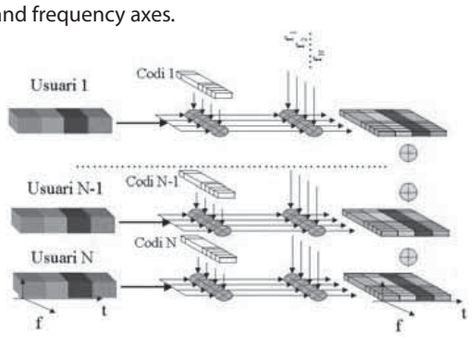

Fig. 1