Supplementary Materials: Monitoring Land-Use/Land-Cover Changes at a Provincial Large Scale Using an Object-Oriented Technique and Medium-Resolution Remote-Sensing Images. *Remote Sensing* 2018, *12*, remotesensing-389233.

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2. Materials

2.2. Satellite Imagery

In this study, we used China's HJ-CCD satellite image Landsat TM as the main remote-sensing data source. We used the HJ-CCD image to map land use information for 2010 and used the Landsat TM image for reconstruction land use information for 2000. Because Landsat TM and HJ-CCD images have the same bands (including red band, green band, blue band, and near infrared band), spatial resolution and similar image features, we used both images to detect changes that occurred between 2000 and 2010. HJ satellites, including the A satellite and B satellite, were launched successfully in September 2008. The satellites are equipped with CCD cameras of four bands with a spatial resolution of 30 m and a revisit period (temporal resolution) of 2–3 days. The main parameters of the HJ-CCD images are shown in Table 1 [28]. Considering the obvious seasonal changes of vegetation and the need for improved classification, we used HJ-CCD images for spring, summer, and winter. To avoid the effect of cloudy weather in southern China on the image quality, we selected 30 clear images, including 12 scenes in spring, 10 scenes in summer, and 8 scenes in winter. In the 30 image scenes, 14 were from the A satellite (HJA-CCD) and 16 were from the B satellite (HJB-CCD) (Table S1). The HJ-CCD images were downloaded from the China Centre for Resources Satellite Data and Application at http://www.cresda.com/CN/. The experimental images included 24 scenes of Landsat TM images for 2000, which come from the Geospatial Data Cloud of China (http://www.gscloud.cn/).

Table S1. China's HJ-CDD images used in the study.

Spring Image	Winter Image	Summer Image
HJ1A-CCD1-5-84-20100318	HJ1B-CCD1-6-80-20101005	HJ1A-CCD2-7-84-20100805
HJ1A-CCD2-4-84-20100114	HJ1A-CCD2-6-84-20101204	HJ1B-CCD1-2-80-20100803
HJ1A-CCD2-2-80-20100317	HJ1B-CCD1-6-84-20101005	HJ1A-CCD1-2-84-20100809
HJ1A-CCD2-4-80-20100114	HJ1A-CCD2-6-80-20101208	HJ1B-CCD1-1-84-20100814
HJ1B-CCD2 -1-84-20100311	HJ1B-CCD2-3-84-20101004	HJ1B-CCD2-3-84-201008 04
HJ1B-CCD2-1-80-20100311	HJ1B-CCD2-1-84-20101221	HJ1A-CCD1-2-84-20100805
HJ1B-CCD1-4 -80-20100312	HJ1B-CCD2-1-84-20101221	HJ1A-CCD2-4-88-20100901
HJ1B-CCD1-4-80-20100312	HJ1B-CCD2-1-88–20100311	HJ1B-CCD2-4-88-20100918
HJ1A-CCD1-7-80- 20100326	HJ1B-CCD2-1-84-20101221	
HJ1A-CCD2-4-84-20100114	HJ1A-CCD1-2-88-20101204	
HJ1B-CCD2-1-84-201 00311		
HJ1A-CCD1-5-84-20100318		

3.2. Object-Based Image Analysis Technique

The OBIA used in this study was based on the smallest unit: in this case, an object with physical meaning, which is a set of adjacent pixels with homogeneity [17]. The basic process of OBIA includes image segmentation and then classification or change detection.

3.2.1. Image Segmentation

In this study, we used a region-merging algorithm that is based on the principle of least heterogeneity to segment images. The basic concept of this algorithm is to assemble adjacent pixels with similarity into polygons. This method first identifies a seed pixel in an area of interest and then splits this pixel as a starting point in the growth. Then, the seed pixel is merged to an adjacent pixel with homogeneity. Next, the new pixels are used as a new seed to repeat this process, until no pixel meets the defined conditions [18], which terminates the segmentation scale [17]. The larger the segmentation scale, the smaller the number of objects obtained and vice versa. Because of the difference in land features, structures, and landscape fragmentation, the appropriate segmentation scale for each type of land cover in the different study areas was different [22]. When the segmentation scale is too large, small grounds are likely to be submerged and to become non-extractable. If the segmentation scale is too small, the computer becomes burdened and produces results with high "salt and pepper" noise [17]. The trial-and-error method is widely used to determine the appropriate segmentation scale. Through repeated attempts, we determined the appropriate segmentation scale for each small section of the image of Hunan Province (Table S2).

Table S2. Appropriate segmentation scale of each small image piece.

Code of Small Image Piece	Woodland	Farmland	Wetland	Imperious Surface	Grassland	Bare Land	Code of Small Image Piece	Woodland	Farm land	Wetland	Imperious Surface	Grassland	Bare Land
N1	45	35	3	5	15	2	N15	45	30	2	3	5	3
N2	45	35	3	5	10	2	N16	16	17	3	2	3	4
N3	25	15	3	3	15	2	N17	28	27	3	2	13	5
N4	60	40	3	5	7	2	N18	29	18	5	7	21	3
N5	21	37	2	4	36	3	N19	17	19	9	8	12	6
N6	15	30	2	6	11	4	N20	20	19	5	7	11	4
N7	11	36	3	7	12	3	N21	16	28	21	10	8	9
N8	30	22	5	3	26	5	N22	2	2	5	3	1	1
N9	12	11	1	-	1	1	N23	32	21	22	14	7	5
N10	29	25	2	8	5	4	N24	31	20	18	10	21	7
N11	2	1	1	1	1	1	N25	4	39	43	16	15	9
N12	31	12	3	17	1	3	N26	10	47	50	5	18	7
N13	10	11	4	36	2	6	N27	2	45	55	3	12	9
N14	32	15	5	9	9	3	N28	41	21	7	4	11	9